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Annotated Bibliography of
the Horn Fly, *Haematobia irritans* (L.),
Including References
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and Other Species Belonging to the Genus *Haematobia*

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**Annotated Bibliography of
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Including References
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and Other Species Belonging to the Genus *Haematobia***

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The horn fly, *Haematobia irritans* (L.), an obligate haematophagous parasite of cattle, is a well-established pest throughout the United States. Endemic to Europe, the horn fly was accidentally introduced into the United States in the latter part of the 19th century, probably from shipments of European cattle. First reported in New Jersey in 1887 (Riley 1889a; Smith 1889b), the spread of the horn fly was rapid, and by 1894, the species had spread throughout the North American Continent (Marlatt 1910).

Even though the horn fly has been with us about 90 years, most of the research efforts in the past have been in chemical control. With the recent upsurge of interest in controlling insects other than by use of chemicals, the importance of previous studies on the biology and ecology of the horn fly and associated species is assuming considerable importance.

Publications concerning the horn fly and closely related species are scattered in past and current literature. None of this biological, ecological, control, or taxonomic information, however, has been brought together in a meaningful way. No efficient way to be informed about previous research has been available.

Here, we compiled a bibliography, including all life stages and all aspects of the biology, ecology, and control of the horn fly. References on the buffalo fly, *Haematobia exigua* (de Meijere), and other closely related members of the genera *Haematobia* and *Lyperosia* are included.

Literature that contains original information relating to biology, systematics, distribution, and control of the horn fly and associated species is annotated. Literature summarizing known information of minor importance is listed.

With few exceptions, periodical abbreviations used in this bibliography are scientific standards found in "BIOSIS, 1971 List of Serials with Coden, Title Abbreviations, New, Changed and Ceased Titles," published by BioScience Information Service of Biological Abstracts. To avoid confusing readers using this bibliography, we have listed known synonyms of the horn fly (Bruce 1964b) and the buffalo fly (Mackerras 1933).

Species Cited in References

Horn fly, *Haematobia irritans* (Linnaeus)

Conops irritans (Linnaeus 1758)

Stomoxys pungens (Fabricius 1794)

Haematobia serrata (Robineau-Desvoidy 1850)

Haematobia tibialis (Robineau-Desvoidy 1850)

Haematobia cornicola (Williston 1899)

Lyperosia irritans (Linnaeus)

Siphona irritans (Linnaeus)

Buffalo fly, *Haematobia exigua* (de Meijere)

Lyperosia exigua (de Meijere 1893)

Lyperosia australis (Malloch 1932)

Lyperosia flavohirta (Brunetti 1910)

Trade names used in this publication are solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture.

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3. ADKINS, T. R. JR., and J. A. SEAWRIGHT. 1967. A SIMPLIFIED DUSTING STATION TO CONTROL FACE FLIES AND HORN FLIES ON CATTLE. J. Econ. Entomol. 60(3): 864-868.
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Presence or absence of buffalo fly in any locality determined by temperature; minimum temperature of 72° required for fly to exist. *Spalangia* sp. was reared and released in an effort to control buffalo fly.

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Spalangia parasites had no effect on buffalo fly populations in Australia.
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Cattle droppings exposed to insect activity for 5 min produced greater number of horn flies than droppings exposed for 30 min or for 2, 4, 6, or 24 hrs. There was a significant negative correlation between the mean number of horn flies and the mean number of insects of other species produced per dropping during the six time intervals studied.

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Described and discussed species of *Spalangia* known to parasitize *Haematobia*.
125. ——— 1965. DESCRIPTION OF NEW SPECIES OF "SPALANGIA" LATR. (HYMENOPTERA, CHALCIDOIDEA) FROM AFRICA AND SOUTH AMERICA, WITH NOTES ON SOME KNOWN SPECIES. *Acta Entomol. Mus. Natl. Pragae.* 36: 593-602.
Supplement to paper listed above.
126. BOURNE, J. R. 1968. BIONOMICS OF THE HORN FLY, "HAEMATOBIA IRRITANS" (L.) IN ALABAMA. *Diss. Abstr. Sect. B.* 29(4) : 1394B.

127. ——— and K. L. HAYS. 1968. EFFECTS OF TEMPERATURE ON PREDATION OF HORN FLY LARVAE BY THE LARVAE OF "SPHAERIDIUM SCARABAEOIDES." J. Econ. Entomol. 61(1) : 321-322.

Optimum temperature for predation on horn fly was 80° F; predation occurred at 50° to 90°.

128. ——— and R. V. NIELSSON. 1967. "NEMOBIUS FASCIATUS"—A PREDATOR ON HORN FLY PUPAE. J. Econ. Entomol. 60(1) : 272-274.

Under laboratory conditions crickets were observed to feed on horn fly pupae.

129. BOYER, W. P. 1946. 9,030 HEAD OF CONTENTED COWS. Prog. Farmer (Miss., Ark., La. Ed.) 61(7) : 14.

130. BRADY, U. E., and B. W. ARTHUR. 1962. ABSORPTION AND METABOLISM OF RUELENE BY ARTHROPODS. J. Econ. Entomol. 55(6) : 833-836.

Horn fly was one of 16 test arthropods; adult Diptera were found to metabolize Ruelene faster than most other insects tested.

131. BRAM, R. A., T. L. BISSELL, and F. P. HARRISON. 1964. A HOMEMADE BACKRUBBER TO CONTROL FLIES. Univ. Md. Ext. Factsheet 159, 3 pp.

132. BRANFORD, R. 1919. NOTE ON AN OUTBREAK OF SURRA AT THE GOVERNMENT CATTLE FARM, HISSAR, AND ON CASES TREATED. Agric. J. India. 14(5) : 762-773.

Surra possibly transmitted by *Haematobia* and other bloodsucking insects.

133. BRETT, C. H. 1946. INSECTICIDAL PROPERTIES OF THE INDIGOBUSH ("AMORPHA FRUTICOSA"). J. Agric. Res. 73(3) : 81-96.

Extract of plant in oil repelled horn flies from cattle.

134. ——— and F. A. FENTON. 1946a. DDT AS A BARN AND CATTLE SPRAY. South. Dairy Prod. J. 40(1) : 62-63.

135. ——— and F. A. FENTON. 1946b. DDT AS A BARN AND CATTLE SPRAY. Okla. A. & M. Mimeo. Circ. No. 156, 7 pp.

136. BRUCE, W. G. 1938. A PRACTICAL TRAP FOR THE CONTROL OF HORN FLIES ON CATTLE. *J. Kans. Entomol. Soc.* 11(3): 88-93.

Construction, use, and efficiency of trap were discussed; fly populations were reduced by 2 weeks of trapping.

137. ——— 1939a. SOME OBSERVATIONS ON INSECT EDAPHOLOGY. *J. Kans. Entomol. Soc.* 12(3): 91-93.

Horn flies were kept in jars of fine sand in which the water content was maintained at given percentages between 0 and 17 percent. Sand containing less than 0.25 percent or more than 14.5 percent moisture inhibited horn fly development.

138. ——— 1939b. THE USE OF PHENOTHIAZINE IN THE MEDICATION OF CATTLE FOR CONTROL OF HORN FLIES. *J. Econ. Entomol.* 32(5): 704-706.

Cattle were fed phenothiazine mixed with bran; 22 mg/kg was required to render the manure unfavorable for horn fly development. Four mg/kg was required if phenothiazine was mixed directly with cow manure.

139. ——— 1940a. THE HORN FLY AND ITS CONTROL. U.S. Dep. Agric. Leaf. 205, 5 pp.

140. ——— 1940b. THE MEDICATION OF CATTLE FOR THE CONTROL OF HORN FLIES. *J. Kans. Entomol. Soc.* 13(2): 41-43.

Tests were made with 29 chemicals to find those toxic to horn flies when fed to cattle; only phenothiazine and rotenone proved to be practical.

141. ——— 1940c. INTRAVENOUS INJECTIONS OF ARSENIC INEFFECTIVE IN CONTROLLING HORN FLIES ON CATTLE. *J. Kans. Entomol. Soc.* 13(4): 128-129.

Manure was toxic to horn fly larvae; adult flies were not affected by arsenic level in the blood. (Irregular results.)

142. ——— 1940d. A CATTLE FLY TRAP FOR THE CONTROL OF HORN FLIES. U.S. Dep. Agric. Bur. Entomol. Plant Quar. E-498.

143. ——— 1942a. ACIDIFIED NICOTINE SPRAYS FOR HORN FLIES ON CATTLE. J. Kans. Entomol. Soc. 15(4): 120-123.

Addition of glacial acetic acid to solutions of nicotine sulfate prolonged their toxicity. Aqueous solutions of pure nicotine, nicotine combined with malic acid, and nicotine combined with lactic acid were tried but were not effective.

144. ——— 1942b. THE HORN FLY. U.S. Dep. Agric., Yearb. 1942: 626-630.

145. ——— 1942c. ZINC OXIDE: A NEW LARVACIDE FOR USE IN THE MEDICATION OF CATTLE FOR THE CONTROL OF HORN FLIES. J. Kans. Entomol. Soc. 15(3): 105-107.

Zinc oxide rendered cow manure larvacidal for 24 hrs after feeding to cattle.

146. ——— 1943. LA MOSCA DEL GANADO Y EL MODO DE COMBATIRLA. Hacienda. 38(4): 176, 179-180.

147. ——— 1964a. THE HORN FLY IN NORTH CAROLINA. N.C. State Univ. Sch. Agric. Ext. Fold. 231, 6 pp.

148. ——— 1964b. THE HISTORY AND BIOLOGY OF THE HORN FLY, "HAEMATOBIA IRRITANS" (LINNAEUS): WITH COMMENTS ON CONTROL. N.C. Agric. Exp. Stn. Tech. Bull. 157, 32 pp.

Bulletin provides excellent source of past and present information on horn fly research; rather complete list of references included.

149. ——— and E. B. BLAKESLEE. 1948. FACTORS AFFECTING TESTS WITH DDT SPRAYS TO CONTROL HORN FLIES. J. Econ. Entomol. 41(1): 39-40.

Life cycle, weather conditions, pasture size, breed of cow, method of treatment, and other factors may affect control of horn flies with DDT.

150. ——— and C. E. EAGLESON. 1938. A NEW METHOD OF FEEDING ADULT HORN FLIES, "HAEMATOBIA IRRITANS" L. AND STABLE FLIES, "STOMOXYS CALCITRANS" L. J. Kans. Entom. Soc. 11(4): 144-145.

Horn fly fed with tubes of blood and water.

151. BRUCE, W. N. 1947. THE BEST DDT FORMULA FOR SPRAYING LIVESTOCK. *Am. Assoc. Econ. Entomol. North Cent. States Br. Proc.* 2: 37-39.
Twenty percent increase in milk flow obtained by spraying with DDT.
152. ——— 1949. ALTERNATE TREATMENT FOR FLY CONTROL. *Am. Assoc. Econ. Entomol. North Cent. States Br. Proc.* 4: 85-89.
153. ——— 1952. AUTOMATIC SPRAYER FOR CONTROL OF BITING FLIES ON CATTLE. *Ill. Nat. Hist. Surv. Biol. Notes* BN24, 8 pp.
154. ——— 1954. USES OF MATERIALS FOR AND LIMITATIONS OF AUTOMATIC SPRAYERS. *Annu. Meet. Entomol. Soc. Am. North Cent. States Br. Proc.* 9(1954): 97-98.
155. ——— and G. C. DECKER. 1947. FLY CONTROL AND MILK FLOW. *J. Econ. Entomol.* 40(4): 530-536.
Heterogeneity in gross herd milk production made it difficult to establish significance of fly control. There was a high degree of inverse correlation between changes in milk production and fly abundance; correlation between changes in milk production and fly abundance was highly significant in the case of selected animals.
156. ——— and G. C. DECKER. 1951. TABANID CONTROL ON DAIRY AND BEEF CATTLE WITH SYNERGIZED PYRETHRINS. *J. Econ. Entomol.* 44(2): 154-159.
Cattle were also kept free of horn flies.
157. ——— and G. C. DECKER. 1957. EXPERIMENTS WITH SEVERAL FORMULATIONS APPLIED TO CATTLE FOR THE CONTROL OF STABLE FLIES. *J. Econ. Entomol.* 50(6): 709-713.
158. ——— and H. B. PETTY. 1948. FLY CONTROL ON THE FARM AND IN THE HOUSE. *Univ. Ill. Ext. Circ. No.* 626, pp. 3, 5-15.
159. BRUNDRETT, H. M., and O. H. GRAHAM. 1958. CONTROL OF HORN FLIES IN THE RIO GRANDE VALLEY OF TEXAS WITH BAYER 21/199 SPRAY. *J. Econ. Entomol.* 51(5): 746.

Flies controlled with spray of 0.5 percent and 0.25 percent concentration.

160. BRUNETTI, E. 1910. REVISION OF THE ORIENTAL BLOOD-SUCKING MUSCIDAE. Rec. Indian Mus. (Calcutta). 4: 59-93.
161. ——— 1913. SOME NOXIOUS DIPTERA FROM GALILEE. J. Proc. Asiatic Soc. (Bengal) 9(1): 43-45.
Lyperosia minuta found in Galilee.
162. BUBBERMAN, C., and F. C. KRANEVELD. 1933. I. ONDERZOEKINGEN OVER AARD EN WEZEN DER CASCADO. Veeartsenijk. Meded. (80): 45-84.
Experiments conducted with transmission of *Stephanofilaria dedoesi* by *Haematobia exigua*; results were not reported.
163. BULLARD, J. F. 1943. COMMON PESTS AND DISEASES. Shorthorn World 28(14): 22-26.
164. BURKS, B. D. 1969. SPECIES OF "SPALANGIA" LATREILLE IN THE UNITED STATES NATIONAL MUSEUM COLLECTION. Smithson. Contrib. Zool. No. 2.
Reappraisal of species of *Spalangia*, some of which are parasites of the horn fly.
165. BURNS, E. C., and J. B. CHAPIN. 1969. ARTHROPODS IN THE DIET OF THE CATTLE EGRET, "BUBULCUS IBIS," IN SOUTHERN LOUISIANA. J. Econ. Entomol. 62(3): 736-738.
Egrets were observed feeding on horn flies.
166. ——— W. G. HARRIS, J. W. TURNER, and others. 1970a. CONTROLLING HORN FLIES WITH INSECTICIDES IN DUST BAGS. La. Agric. 13(3): 3, 16.
Use of dust bags gave good fly control.
167. ——— W. G. HARRIS, J. W. TURNER, and others. 1970b. HORN FLY CONTROL USING INSECTICIDES IN DUST BAGS. Livest. Prod. Day Proc. 10: 79-80.
168. ——— S. E. MCCRAIN, and D. W. MOODY. 1959a. KORLAN

AND CO-RAL FOR HORN FLY CONTROL ON RUBBERS. (Abstract) Assoc. South. Agric. Workers Proc. 56: 129.

169. ——— S. E. MCCRAIN, and D. W. MOODY. 1959b. RONNEL AND CO-RAL FOR HORN FLY CONTROL ON CABLE TYPE BACK-RUBBERS. J. Econ. Entomol. 52(4) : 648-650.
Both insecticides controlled flies and compared favorably with toxaphene.
170. ——— and B. H. WILSON. 1963. FIELD RESISTANCE OF HORN FLIES TO THE ORGANIC PHOSPHATE INSECTICIDE RONNEL. J. Econ. Entomol. 56(5) : 718.
A population of ronnel resistant flies was located near Macksville, La.
171. ——— B. H. WILSON, R. S. TEMPLE, and C. C. PHILLIPS. 1962a. COLOR PREFERENCE OF HORN FLIES. Anim. Sci. Dep. La. State Univ. Agric. Exp. Stn. Livestock Prod. Day Bull. 2: 37-40.
172. ——— B. H. WILSON, R. S. TEMPLE, and C. C. PHILLIPS. 1962b. AN ECONOMICAL PRACTICE: CONTROL HORN FLIES WITH BACKRUBBERS. La. Agric. 5(3) : 3.
173. BUSHLAND, R. C., H. V. CLABORN, H. F. BECKMAN, and others. 1950. CONTAMINATION OF MEAT AND MILK BY CHLORINATED HYDROCARBON INSECTICIDES USED FOR LIVESTOCK PEST CONTROL. J. Econ. Entomol. 43(5) : 649-652.
174. BÜTTIKER, W. 1966. THE ECTOPARASITES OF THE EUROPEAN DOMESTIC BUFFALO ("BUBALUS BUBALIS") IN ITALY. (In Italian.) Mitt. Schweiz. Entomol. Ges. 38(3-4) : 213-217.
Horn fly recorded as one of the six pests of buffalo.
175. CALER, H. L. 1931. VOLCK SPECIAL EMULSION NUMBER 2 AS A CONTROL FOR EXTERNAL PARASITES OF ANIMALS. J. Kans. Entomol. Soc. 4(4) : 88-93.
Various repellents tested for horn fly control.
176. CAMPBELL, F. L., and F. R. MOULTON (eds.). 1943. LABORATORY PROCEDURES IN THE STUDIES OF THE CHEMICAL CONTROL OF INSECTS. REARING INSECTS AFFECTING MAN AND ANIMALS. Am. Assoc. Adv. Sci. Publ. No. 20, p. 71.
Methods for rearing horn flies presented.

177. CAMPBELL, J. B., and E. S. RAUN. 1971. AERIAL ULV AND LV APPLICATIONS OF INSECTICIDES FOR CONTROL OF THE STABLE FLY AND THE HORN FLY. J. Econ. Entomol. 64(5) : 1170-1173.

ULV applications of various insecticide formulations from airplanes resulted in 90 percent reduction in numbers of horn flies on cattle. Aerial applications of Naled did not give satisfactory fly control.

178. CAMPBELL, T. G. 1938. RECENT INVESTIGATIONS ON THE BUFFALO FLY ("LYPEROSIA EXIGUA" DE MEIJERE) AND ITS PARASITES IN NORTH AUSTRALIA. J. Coun. Sci. Ind. Res. Aust. 11(1) : 77-82.

The introduced parasite, *Spalangia sindaica*, failed to become established or it merged into populations of *S. orientalis* by interbreeding.

179. CANCEINNE, E. A., J. S. TYNES, E. C. BURNS, and B. H. WILSON. 1969. HORN FLY CONTROL WITH BACKRUBBERS. Univ. La. Agric. Ext. Coop. Ext. Pub. 1343, 6 pp.

180. CARLYLE, W. L. 1899. PROTECTING COWS FROM FLIES. Agric. Exp. Stn. Annu. Rep., Univ. Wis. (Madison), 16(1899) : 92-96.

Cows in the paddock gave slightly more milk with a higher butterfat content and consumed less feed than cows in a relatively fly-free barn.

181. CARR, A. K. 1947. SPRAYING CATTLE FOR HORN FLIES AND MOSQUITOS. Calif. Dep. Agric. Bull. No. 35, p. 289.

182. CARTER, R. H., R. W. WELLS, R. D. RADCLIFF, and others. 1949. THE CHLORINATED HYDROCARBON CONTENT OF MILK FROM CATTLE SPRAYED FOR THE CONTROL OF HORN FLIES. J. Econ. Entomol. 42(1) : 116-118.

183. CASIDA, J. E. 1960. ORGANOPHOSPHORUS SYSTEMIC INSECTICIDES. BIOLOGICAL AND CHEMICAL CONTROL OF PLANT AND ANIMAL PESTS. L. P. Reitz, ed., Am. Assoc. Adv. Sci. Publ. No. 61, pp. 90-91.

184. CHAMBERS, F. 1917. NOTE ON THE TRANSMISSION OF ANIMAL TRYPANOSOMIASIS IN NORTHERN RHODESIA BY BLOOD-

SUCKING FLIES OTHER THAN "GLOSSINA." Trop. Vet. Bull. 5(4): 222. (Abstr. in Vet. Rev. 1(3): 222-227. 1917.)

Lyperosia may be vector of trypanosomiasis.

185. CHENG, TIEN-HSI. 1958. THE EFFECT OF BITING FLY CONTROL ON WEIGHT GAIN IN BEEF CATTLE. J. Econ. Entomol. 51(3): 275-278.

Treated cattle gained more weight than untreated cattle; cost of treatment was less than 1 cent/day/animal.

186. ——— D. E. H. FREAR, and H. F. ENOS. 1958. THE USE OF TREATMENTS CONTAINING METHOXYCHLOR AGAINST BITING FLIES ON CATTLE AND THE DETERMINATION OF METHOXYCHLOR RESIDUES IN MILK. J. Econ. Entomol. 51(5): 618-623.

Horn flies easily controlled. Cattle using backrubbers exhibited less insecticide residue than sprayed cattle.

187. ——— D. E. H. FREAR, and H. F. ENOS. 1959. EFFECTIVENESS OF AEROSOL FORMULATIONS CONTAINING METHOXYCHLOR AND OTHER INSECTICIDE REPELLENTS AGAINST BITING FLIES ON CATTLE AND ANALYSES OF MILK FROM TREATED ANIMALS. J. Econ. Entomol. 52(5): 866-868.

Aerosols gave good control of the horn fly and no detectable insecticide residues were found in the milk.

188. ——— D. E. H. FREAR, and H. F. ENOS. 1961. FLY CONTROL IN DAIRY BARNS SPRAYED WITH DIMETHOATE AND THE DETERMINATION OF DIMETHOATE RESIDUES IN MILK. J. Econ. Entomol. 54(4): 740-742.

Good horn fly control obtained, lasting 5 to 9 weeks. No residues found in the milk.

189. ——— D. E. H. FREAR, and H. F. ENOS. 1962. THE USE OF SPRAY AND AEROSOL FORMULATIONS CONTAINING R-1207 AND DIMETHOATE FOR FLY CONTROL ON CATTLE AND THE DETERMINATION OF DIMETHOATE RESIDUES IN MILK. J. Econ. Entomol. 55(1): 39-43.

Good horn fly control obtained, no residues present.

190. ——— A. A. HOWER, and R. K. SPRENKEL. 1965. OIL BASED AND WATER BASED CIODRIN SPRAYS FOR FLY CONTROL ON DAIRY CATTLE. J. Econ. Entomol. 58(5): 910-913.

Good horn fly control obtained using both mixtures.

191. ——— and E. M. KESLER. 1961. A THREE YEAR STUDY ON THE EFFECT OF FLY CONTROL ON MILK PRODUCTION BY SELECTED RANDOMIZED DAIRY HERDS. J. Econ. Entomol. 54(4) : 751-757.

Fly control did not have a significant effect on milk production on well-managed herds. Milk production from poorly managed herds was prevented from decreasing by use of insecticides.

192. ——— and J. P. VANDERBERG. 1958. THE TREADLE SPRAYER AND THE CABLE-TYPE BACKRUBBER FOR CONTROL OF BITING FLIES ON CATTLE IN PENNSYLVANIA. J. Econ. Entomol. 51(2) : 149-156.

Control of horn flies was good with both methods.

193. CHITTENDEN, F. H. 1903. THE PRINCIPAL INJURIOUS INSECTS IN 1902. U.S. Dep. Agric. Yearb. 1903 : 726-733.

194. ——— 1904. THE PRINCIPAL INJURIOUS INSECTS OF 1903. U.S. Dep. Agric. Yearb. 1904 : 563-566.

195. CHOCK, Q. C. 1957. Hawaii. Entomol. Soc. Proc. 16(3) : 324.

Discussion and exhibition of several species of scarabaeid dung beetles which were released for horn fly control.

196. CHORLEY, J. K. 1922. TSETSE-FLY, EASTERN BORDER. Rhod. Agric. J. 19(6) : 680-682.

Transmission of trypanosomes may be possible by *Lyperosia*.

197. CLABORN, H. V. 1956. INSECTICIDE RESIDUES IN MEAT AND MILK. U.S. Dep. Agric., Agric. Res. Serv. ARS 33-25, pp. 6-7, 9.

198. ——— H. F. BECKMAN, and R. W. WELLS. 1950. EXCRETION OF DDT AND TDE IN MILK FROM COWS TREATED WITH THESE INSECTICIDES. J. Econ. Entomol. 43(6) : 850-852.

Treated cattle excreted DDT and TDE in milk throughout the season (0.14-0.33 p/m).

199. ——— H. D. MANN, I. L. BERRY, and R. A. HOFFMAN. 1965. COMPARISONS OF RESIDUES IN MILK RESULTING

FROM TWO TYPES OF SPRAY APPLICATIONS OF DDT, SHELL COMPOUND 4072, AND RONNEL. *J. Econ. Entomol.* 58(5) : 922-923.

Residues in milk were reduced by proper use of the insecticides. Horn flies were controlled by applications of minimum amounts of insecticides in small doses; residues from all tested insecticides were low.

200. CLEVELAND, C. R. 1926. REPELLENT SPRAYS FOR FLIES ATTACKING DAIRY CATTLE. *J. Econ. Entomol.* 19:529-536.

Sprayed cows were observed to be more contented than unsprayed cows.

201. CLYBURN, T. M. 1947. CONTROLLING CATTLE INSECTS WITH DDT. *S.C. Exp. Stn., Clemson Agric. Coll. Annu. Rep.*, 59(1947) : 95.

202. COFFEE, M. D. 1966. STUDIES ON THE ASSOCIATION OF FLIES (DIPTERA) WITH DUNG IN SOUTHEASTERN WASHINGTON. *Ann. Entomol. Soc. Am.* 59(1) : 207-218.

Species of flies attracted to or reared, or both, from all available types of excrement in southeastern Washington were recorded. Results presented of studies on the relative attractiveness of eight main types of dung to the fly population. One hundred thirty-nine species of diptera recorded; of these, 48 were considered to be members of the dung community. Cow dung attracted the largest number and widest variety of species of insects. Information given for each species concerning dung preferences and other pertinent data. Horn fly was recovered from both cow and horse dung.

203. COLE, F. R., and E. N. SCHLINGER. 1969. THE FLIES OF WESTERN NORTH AMERICA. Pp. 472-473. Berkeley, Los Angeles.

204. COLEMAN, R. B. 1964. CONTROL OF EXTERNAL PESTS OF LIVESTOCK. *Coop. Ext. Serv. Univ. Ga., Coll. Agric. Cir.* 541.

205. COLLIER, W. A. 1928. DIE DERRENGADERA UND IHRE BEKÄMPFUNG. *Dtsch. Tieraeztl. Wochenschr.* 36(45) : 749-752.

Horn fly may play an important part in the transmission of trypanosomes.

206. COMBS, R. L. and C. E. HOELSCHER. 1968. DUSTING STATIONS PROVIDE CONTROL OF HORN FLIES. Miss. Agric. Exp. Stn. Inform. Sheet 1027, 2 pp.

207. ——— and C. E. HOELSCHER. 1969. HYMENOPTEROUS PUPAL PARASITIDS FOUND ASSOCIATED WITH THE HORN FLY IN NORTHEAST MISSISSIPPI. J. Econ. Entomol. 62(4) : 1234-1235.

Seven pupal parasites were recovered from the horn fly.

208. COQUILLET, D. W. 1910. THE TYPE SPECIES OF THE NORTH AMERICAN GENERA OF DIPTERA. U.S. Natl. Mus. Proc. 37(1719) : 549.

209. CORDLEY, A. B. 1900. THE GENUINE HORN FLY IN OREGON. Oreg. Agric. Rural Northwest, Sept. 15, p. 9.

210. CORY, E. N. 1917. THE PROTECTION OF DAIRY CATTLE FROM FLIES. J. Econ. Entomol. 10: 111.

Preliminary tests indicated that an increased average yield should result from fly control.

211. ——— H. G. HARNS, and W. H. ANDERSON. 1936. DUSTS FOR CONTROL OF FLIES ON CATTLE. J. Econ Entomol. 29: 331-335.

Mixtures of pyrethrum and derris gave good fly control.

212. ——— and G. S. LANGFORD. 1950. FLY CONTROL. Univ. Md. Ext. Serv. Ext. Bull. No. 136, 7 pp.

213. CRAGG, F. W. 1913. STUDIES ON THE MOUTH PARTS AND SUCKING APPARATUS OF THE BLOOD-SUCKING DIPTERA. Officers Med. and Sanit. Dep., India, Scientific Mem. 60: 1-56.

Evolution of the muscids discussed.

214. CREELMAN, I. S. 1966. Can. Insect Pest Rev. 44: 22.

215. ——— 1967. Can. Insect Pest Rev. 45: 15.
216. CROSS, H. E. 1916. ANNUAL REPORT OF THE CAMEL SPECIALIST FOR THE YEAR 1915-16. Lahore, 27 pp.
Horn fly and other biting flies may transmit surra to camels.
217. CUFF, R. L. 1946. LIVESTOCK SPRAYS. Soap Sanit. Chem. 22(8): 135-137, 181.
Cattle sprayed for horn flies gained an average of one-half lb. day more than unsprayed cattle.
218. ——— 1947. FLIES MAKE PROFITS FLY. Down Earth. 3(2): 2-4.
219. ——— 1950. FUSED BENONITE SULPHUR TO PROLONG HORN FLY PROTECTION ON BEEF CATTLE. J. Econ. Entomol. 43(1): 111-112.
Bentonite sulphur increased the effectiveness of DDT compounds.
220. ——— 1954. LABOR FREE CONTROL OF EXTERNAL PESTS. Natl. Live Stock Prod. 32(7): 16, 23.
221. ——— 1961. WHAT'S NEW IN PARASITE CONTROL. Brangus J. 9(4): 10.
222. CURRAN, C. H. 1965. THE FAMILIES AND GENERA OF NORTH AMERICAN DIPTERA. Woodhaven, N.Y. 515 pp.
223. CUTHBERTSON, A. 1932. NOTES ON THE HABITS OF SOME DIPTERA IN RHODESIA. Rhod. Sci. Assoc. Proc. 31: 31-36.
224. CUTKOMP, L. K. 1956. THE WEIGHT RESPONSES OF BEEF CATTLE TO CONTROL OF HORN AND STABLE FLIES. (Abstract). Bull. Entomol. Soc. Am. 2(3): 24.
225. ——— 1957. ARE THE PROBLEMS OF RESISTANCE TO CHLORINATED HYDROCARBONS SIMILAR TO THOSE WITH ORGANOPHOSPHATES? North Cent. States Br. Entomol. Soc. Am. Proc. 12: 64.
Horn fly was found to have a narrow genetic background in comparison with the house fly.

226. ——— and A. L. HARVEY. 1958. THE WEIGHT RESPONSES OF BEEF CATTLE IN RELATION TO CONTROL OF HORN AND STABLE FLIES. J. Econ. Entomol. 51(1) : 72-75.
Significant weight gains were evident in cattle treated for biting flies.
227. ——— and J. A. LOFGREN. 1962. FLY CONTROL FOR LIVESTOCK. Univ. Minn. Agric. Ext. Folder 192, 8 pp. (rev).
228. DAHM, P. A. 1950. CONTROL OF INSECT PESTS OF DOMESTIC ANIMALS AND MAN. Kans. Agric. Exp. Stn., Fifteenth Biennial Rep. of the Director, 1948-50, pp. 76-77.
229. ——— K. HESS, R. C. SMITH, and F. W. BELL. 1948. CONTROL OF INSECT PESTS OF DOMESTIC ANIMALS AND MAN. Kans. Agric. Exp. Stn., Fourteenth biennial Rep. of the Director, 1946-48, p. 75.
230. DALRYMPLE, W. H. 1906. OUR INSECT ENEMIES. Am. Vet. Rev. 30 : 947-950.
231. DARABANTU, C. 1967. A CONTRIBUTION TO THE STUDY OF SOME SPECIES OF MUSCINAE AND STOMOXYDINAE (DIPTERA) OF ROMANIA. (In Romanian.) Cluj. Univ. Babes-Bolyai. Stud. Ser. Biol. 12(2) : 103-105.
English summary. Discussed biology of *Haematobia atripalpis*.
232. DAVIDSON, J. 1937. THE TEMPERATURE-DEVELOPMENT CURVE OF "LYPEROSIA EXIGUA" DE MEIJERE (DIPTERA, MUSCIDAE) IN RELATION TO THE PROBABLE DISTRIBUTION OF THIS INSECT IN AUSTRALIA. Aust. J. Exp. Biol. Med. Sci. 12(2) : 113-120.
Distribution of buffalo fly was determined by monthly ratio of precipitation, evaporation, and temperature.
233. DAVIS, C. J. 1958. RECENT INTRODUCTIONS FOR BIOLOGICAL CONTROL IN HAWAII-III. Hawaii. Entomol. Soc. Proc. 16(3) : 358.
234. ——— 1959. RECENT INTRODUCTIONS FOR BIOLOGICAL CONTROL IN HAWAII-IV. Hawaii. Entomol. Soc. Proc. 17(1) : 62-66.

235. DAVIS, G. C. 1893. LOCUSTS: THE HORN FLY. Mich. Agric. Exp. Stn. Bull. No. 98. Also in Stn. Rep. for 1893, pp. 397-402.
236. DEFOLIART, G. R. 1954. YOU CAN WHIP HORN FLIES. Wyo. Roundup 1:3.
237. ——— 1956a. HORN FLY CONTROL WITH CHLORINATED INSECTICIDES. J. Econ. Entomol. 47(2):266-268.
DDT and CS-708 found to be most effective on horn flies.
238. ——— 1956b. DUSTING FOR HORN FLY CONTROL ON BEEF HERDS. J. Econ. Entomol. 49(3):393.
A modified rotary duster was used to apply insecticides on large herds.
239. ——— 1956c. DUST THOSE HORN FLIES! IT'S A LIFESAVER FOR RANGE CATTLE. Wyo. Roundup 4:6.
240. ——— 1963. PREVENTIVE SPRAYING SCHEDULES FOR DAIRY FARM FLY CONTROL. J. Econ. Entomol. 56(5):649-654.
Good control of biting flies was obtained by spraying with Ciodrin, Sevin, and Co-Ral on a weekly basis; best results were obtained by treating cattle before flies became numerous.
241. ——— 1964. FLY CONTROL FOR '64. Hoard's Dairyman 109(10):583.
242. ——— and J. L. Eschle. 1961. BARN FOGGING AS A FLY CONTROL METHOD. J. Econ. Entomol. 54(5):862-865.
Fogging gave adequate horn fly control, but it cost 2 to 4 times as much as residual spraying.
243. ——— and D. N. WILLETT. 1961. METHOXYCHLOR IN MILK OF DAIRY COWS DUSTED WITH THE WETTABLE POWDER. J. Econ. Entomol. 54(5):871-873.
Residual amounts of less than 0.1 p/m were found in milk.
244. DELEON, D. D. 1961-62. SOME OBSERVATIONS AND INDICATIONS ON THE EFFICIENCY OF BAYER 21/199 (CO-RAL)

AS A PARASITICIDE IN LIVESTOCK. Univ. Philipp. Vet.
6(3/4) : 26-27.

245. DENNING, D. G., and R. E. PFADT. 1950. EVALUATION OF CERTAIN INSECTICIDES IN HORN FLY CONTROL. J. Econ. Entomol. 43(4) : 557-558.

DDT and related compounds gave adequate horn fly control; 4 to 5 treatments were needed for seasonal fly control.

246. DEPNER, K. R. 1961. THE EFFECT OF TEMPERATURE ON DEVELOPMENT AND DIAPAUSE OF THE HORN FLY ("SIPHONA IRRITANS"). Can. Entomol. 103: 855-859.

Development of horn fly was studied in the laboratory and at three field locations. Incubation periods of horn fly eggs were 50, 22, and 18 hours at temperatures of 65, 75, and 86° F, respectively. Larval periods to puparium formation were 10.5, 5.6, and 3.7 days while time from puparium formation to emergence of adults was 13.5, 7.1, and 4.9 days at temperatures of 65, 75, and 86° F, respectively. Photoperiod induced a predisposition to enter a state of diapause which appeared in puparia from eggs laid in the fourth week of July and thereafter.

247. ——— 1962a. THE HORN FLY PROBLEM IN WESTERN CANADA. Res. Farmers 7(2) : 12-13.

248. ——— 1962b. EFFECTS OF PHOTOPERIOD AND OF ULTRA-VIOLET RADIATION ON THE INCIDENCE OF DIAPAUSE IN THE HORN FLY, "HAEMATOBIA IRRITANS" (L.) (DIPTERA: MUSCIDAE). Int. J. Biometeorol. 5(2) : 68-71.

More pupae entered diapause following a 12-hr photoperiod than one of 16 hrs; more pupae entered diapause following a 16-hr photoperiod than one of 20 hrs; 14 times as many pupae entered diapause after the 12-hr photoperiod than after the 20-hr photoperiod.

249. ——— 1962c. CONTINUOUS PROPAGATION OF THE HORN FLY, "HAEMATOBIA IRRITANS" (L.) (DIPTERA: MUSCIDAE). Can. Entomol. 94(8) : 893-895.

Horn flies were reared on adult cattle; the immature stages were reared in fresh dung. Colony was continued for 23 generations with no loss of vigor. Suggestions made for a simplified method of horn fly propagation.

250. ——— 1965. ULTRAVIOLET IRRADIATION OF CATTLE IN RELATION TO DIAPAUSE IN THE HORN FLY "HAEMATOBIA IRRITANS" (L.) (DIPTERA: MUSCIDAE). *Int. J. Biometerol.* 9(2) : 167-170.
Exposure to UV light had a depressing effect on the percentage of pupal diapause in progeny of adults.
251. ——— 1968. HYMENOPTEROUS PARASITES OF THE HORN FLY, "HAEMATOBIA IRRITANS," IN ALBERTA. *Can. Entomol.* 100(10) : 1057-1060.
Parasitism of the horn fly was studied in six regions in Alberta; eight species of parasites were recovered.
252. DERBENEVA-UKHOVA, V. P. 1942. THE FLY-MAGGOTS AS COMPONENTS OF THE DUNG BIOCENOSES. (In Russian.) *Med. Parazitol.* 11(3) : 79-86. (Abstract in *Rev. Appl. Entomol.* 32: 52, 1944.)
253. DETHIER, V. G. 1957. THE SENSORY PHYSIOLOGY OF BLOOD-SUCKING ARTHROPODS. *Exp. Parasitol.* 6: 68-122.
Lyperosia was found positively thermotactic, able to perceive water at a distance, and was stimulated by moisture to extend its proboscis. Sucking was started by the taste of blood or blood serum. *L. exigua* was able to differentiate between hosts on the basis of skin type.
254. DICKE, R. J. 1953. BARN FLIES AND THEIR CONTROL. *Univ. Wis. Ext. Serv. Circ. No. 452*, 8 pp.
255. DICKINSON, C. G. 1918. REPORT OF THE CHIEF VETERINARY OFFICER. Northern Territory Australia Rep. Admin., 1915-16 and 1916-17, pp. 42-43.
256. ——— and G. F. HILL. 1916. INVESTIGATIONS INTO THE CAUSE OF WORM NODULES ("ONCHOCERCA GIBSONI") IN CATTLE. *Dep. Trade Customs, Aust., Rep.* 7 p.
Lyperosia exigua was eliminated as a possible vector of *O. gibsoni*.
257. DIKMANS, G. 1927. REPORT OF THE PARASITOLOGIST. P.R. Agric. Exp. Stn. Rep. 1925: 22-24.
Horn fly was found on cattle inhabiting the dryer areas of the island.

258. ——— 1950. THE TRANSMISSION OF ANAPLASMOSIS. *Am. J. Vet. Res.* 11(38): 5-16.

Horn fly was reported to be mechanical vector of anaplasmosis.

259. DOBSON, R. C. 1962. 1961 HORN FLY CONTROL BY CABLE RUBBERS, SOUTHERN INDIANA FORAGE FARM. *Ind. Agric. Exp. Stn. Res. Prog. Rep.* 27, 1 p.

260. ——— and W. E. FLINT. 1953. STOP THOSE HORN FLIES. *Univ. N. Mex. Ext. Circ.* 241, 4 pp.

261. ——— and W. E. FLINT. 1954. STOP THOSE HORN FLIES WITH SELF-TREATMENT DEVICES. *Tex. Livestock J.* 13: 32.

262. ——— F. W. KUTZ, and D. P. SANDERS. 1970. ATTRACTION OF HORN FLIES TO TESTOSTERONE-TREATED STEERS. *J. Econ. Entomol.* 63(1): 323-325.

Testosterone increased susceptibility to attack by horn flies.

263. ——— and R. C. PETERSON. 1963. HORN FLY CONTROL ON BEEF CATTLE BY THE USE OF CABLE RUBBERS. *J. Econ. Entomol.* 56(2): 230-234.

Various insecticidal formulations were tested on back-rubbers; most were quite effective against the horn fly. Placement of the apparatus and frequency of use affected the efficiency and duration of insecticidal effectiveness.

264. ——— and D. P. SANDERS. 1965a. LOW VOLUME-HIGH CONCENTRATION SPRAYING FOR HORN FLY AND FACE FLY CONTROL ON BEEF CATTLE. *Entomol. Soc. Amer. North Cent. States Br. Proc.* 20: 80-81.

Control using malathion was effective for 1 week, but flies reached their former levels after 2 weeks.

265. ——— and D. P. SANDERS. 1965b. LOW VOLUME, HIGH CONCENTRATION SPRAYING FOR HORN FLY AND FACE FLY CONTROL ON BEEF CATTLE. *J. Econ. Entomol.* 58(2): 379.

Same as above.

266. DODGE, G. M. 1899. CONCERNING FLIES. Colman's Rural World, Sept. 14.
267. DONOHUE, E. L., and J. COWLING. 1948. CHEMICAL CONTROL OF CATTLE PARASITES. Agric. Chem. 3(2): 28-31, 74-75, 77.
Good horn fly control was obtained by weekly spraying mixture of piperonyl butoxide and pyrethrins.
268. DORSEY, C. K., J. O. HEISHMAN, and C. H. TAYLOR. 1962. HORN FLY CONTROL—USING SPRAY, DUST, AND POUR-ON FORMULATIONS. J. Econ. Entomol. 55(4): 425-430.
Various insecticide formulations gave good to excellent control for periods up to 28 days. Dust and pour-on applications provided better fly control than did sprays.
269. ——— J. O. HEISHMAN, and C. J. CUNNINGHAM. 1966. FACE FLY AND HORN FLY CONTROL ON CATTLE, 1962-64. J. Econ. Entomol. 59(3): 726-732.
Self-treatment devices such as the backrubber, dust bags, and insecticide mineral blocks were used to control the horn fly. Backrubbers were arranged in a triangular form; good horn fly control was obtained using a variety of insecticides on the rubbers. Dust bags also provided a good method of control using formulations of Baygon and Fenthion.
270. DOTEN, S. B. 1921. HORSE-FLIES AND CATTLE. Nev. Agric. Exp. Stn. Bull. No. 102, p. 7.
271. DRUMMOND, R. O. 1958. LABORATORY SCREENING TESTS OF ANIMAL SYSTEMIC INSECTICIDES. J. Econ. Entomol. 51(4): 425-427.
272. ——— 1960. PRELIMINARY EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES. J. Econ. Entomol. 53(6): 1125-1127.
273. ——— 1961. COMPOUNDS SCREENED AS ANIMAL SYSTEMIC INSECTICIDES AT KERRVILLE, TEXAS, 1953-59. U.S. Dep. Agric., Agric. Res. Serv. ARS 33-64, 50 pp.

274. ——— 1962. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1961. J. Econ. Entomol. 55(3) : 398-402.
275. ——— 1963. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1962. J. Econ. Entomol. 56(6) : 831-834.
276. ——— 1964. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1963. J. Econ. Entomol. 57(5) : 741-745.
277. ——— 1965. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1964. J. Econ. Entomol. 58(4) : 773-776.
278. ——— 1966. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1965. J. Econ. Entomol. 59(5) : 1049-1053.
279. ——— 1967. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1966. J. Econ. Entomol. 60(3) : 733-737.
280. ——— 1968. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1967. J. Econ. Entomol. 61(5) : 1261-1264.
281. ——— 1963. TOXICITY TO HOUSE FLIES AND HORN FLIES OF MANURE FROM INSECTICIDE FED CATTLE. J. Econ. Entomol. 56(3) : 344-347.

Various systemic insecticides were fed to cattle; all were effective against horn fly.
282. ——— 1970. COMPOUNDS SCREENED AS ANIMAL SYSTEMIC INSECTICIDES AT KERRVILLE, TEXAS, 1960-67. U.S. Dep. Agric. Prod. Res. Rep. 116, 46 pp.
283. ——— D. I. DARROW, and W. J. GLADNEY. 1970. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1969. J. Econ. Entomol. 63(4) : 1103-1106.
284. ——— D. I. DARROW, and W. J. GLADNEY. 1971. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1970. J. Econ. Entomol. 64(5) : 1166-1170.
285. ——— and W. J. GLADNEY. 1969. FURTHER EVALUATION OF ANIMAL SYSTEMIC INSECTICIDES, 1968. J. Econ. Entomol. 62(4) : 934-936.

286. ——— T. M. WHETSTONE, and S. E. ERNST. 1967. CONTROL OF LARVAE OF HOUSE FLY AND THE HORN FLY IN MANURE OF INSECTICIDE FED CATTLE. J. Econ. Entomol. 60(5) : 1306-1308.

Eggs of house fly and horn fly were added to manure of cattle fed various insecticides; some were able to control horn fly.

287. DUMBLETON, L. J. 1957. PARASITES AND PREDATORS INTRODUCED INTO PACIFIC ISLANDS FOR THE BIOLOGICAL CONTROL OF INSECTS AND OTHER PESTS. South Pac. Comm. Tech. Pap. No. 101.

Various species of *Spalangia* were introduced into the islands to control horn fly and house fly. Two species of dung beetles were also introduced: islands included Fiji, Guam, Solomons, and Samoa.

288. DURKIN, J. J. 1970. BEEF CATTLE INSECT CONTROL GUIDE. Coop. Ext. Serv. N. Mex. State Univ. Bull. 400-J-4, 16 pp.

289. ——— and W. E. FLINT. 1955. STOP THOSE HORN FLIES! Univ. N. Mex. Agric. Coll. Ext. Circ. 263, 4 pp.

290. DU TOIT, R. A. 1941. A WATER MISCIBLE LIVESTOCK SPRAY CONTAINING PYRETHRUM EXTRACT. J. S. Afr. Vet. Med. Assoc. 12(1) : 35-37.

291. ——— and B. SMIT. 1939. THE HORN FLY PROBLEM IN SOUTH AFRICA. Farming S. Afr. Rep. No. 112, 2 pp.

Lyperosia minuta caused milk and weight loss in cattle and caused lesions which may leave animals open to screwworm attack. Movement of fly limited by weather conditions; it preferred humid low lying areas to dry or excessive wet weather.

292. EAGLESON, C. 1940. LIVESTOCK SPRAYS. A RAPID METHOD FOR DETERMINING THEIR TOXICITY. Soap Chem. Spec. 16(7) : 96-99, 117.

Horn flies were found susceptible to livestock sprays.

293. ECKLES, C. H. 1905. TESTS OF A FLY REPELLENT. Univ. Mo., Agric. Exp. Stn. Bull. No. 68, pp 35-39.

Annoyance of cattle was prevented by use of repellents, but the production of milk and butterfat was not appreciably affected.

294. ——— and E. L. ANTHONY. 1950. DAIRY CATTLE AND MILK PRODUCTION. 4th ed., pp. 342-344. New York.
295. EDDY, G. W. 1951. AMINOPHENOLS AS ANTIOXIDANTS FOR PYRETHRUM. *J. Econ. Entomol.* 44(1) : 109-111.
Aminophenols extended the effectiveness of pyrethrum against horn fly.
296. ——— and C. H. GRAHAM. 1949. TESTS TO CONTROL HORN FLIES WITH NEW INSECTICIDES. *J. Econ. Entomol.* 42(2) : 265-268.
Methoxychlor provided the best residual action of all insecticides tested; toxaphene and DDT gave best results in field tests.
297. ———, W. S. MCGREGOR, D. E. HOPKINS, J. M. DRIESS, and R. D. RADELEFF. 1954. EFFECTS ON SOME INSECTS OF THE BLOOD AND MANURE OF CATTLE FED CERTAIN CHLORINATED HYDROCARBON INSECTICIDES. *J. Econ. Entomol.* 47(1) : 35-38.
Lindane fed to cattle was effective against horn flies feeding on treated animals; the manure was also toxic to fly larvae.
298. ——— and A. R. ROTH. 1961. TOXICITY TO FLY LARVAE OF THE FECES OF INSECTICIDE FED CATTLE. *J. Econ. Entomol.* 54(3) : 408-411.
Twenty-five different compounds were fed to cattle; of these, 14 were not completely lethal. Bayer 22408 and Co-Ral were most effective compounds tested; the horn fly was susceptible to dosages as low as 1 mg/kg.
299. ——— A. R. ROTH, and F. W. PLAPP. 1962. STUDIES ON THE FLIGHT HABITS OF SOME MARKED INSECTS. *J. Econ. Entomol.* 55(5) : 603-607.
Several thousand stable flies and several hundred horn flies marked with P-32 and fluorescent dyes were released. Of 1,500 horn flies released seven marked flies were recovered at distances 1 to 5 miles from the release point.
300. EHEART, J. F., E. C. TURNER, and J. DICKINSON. 1962. RESIDUES OF SEVIN IN WHOLE MILK FROM SPRAYED AND

DUSTED COWS. J. Econ. Entomol. 55(4) : 504-505.

Fifteen-day horn fly control was obtained by use of Sevin dust; no residues resulted when cattle dusted after milking in morning.

301. ELDRIDGE, B. F., and M. T. JAMES. 1957. THE TYPICAL MUSCID FLIES OF CALIFORNIA (DIPTERA:MUSCIDAE, MUSCINAE). Calif. Insect Surv. Bull. 6: 6, 7.

302. ENDERLEIN, G. 1929. UBER DIE KLASSIFIKATION DER STOMOXINAE (BLUTSAUGENDE MUSCIDEN) UND NEUE ARTEN AUS EUROPA UND AFRIKA. Z. Angew. Entomol. 14(2) : 356-368.

303. ESCHLE, J. L. and I. L. BERRY. 1967. LOW-VOLUME APPLICATION OF INSECTICIDES TO CATTLE FOR CONTROL OF THE HORN FLY. J. Econ. Entomol. 60(1) : 293-294.

Horn flies effectively controlled with Ronnel applied by auto-foot-actuated sprayer.

304. ESSIG, H. W., and W. A. PUND. 1965. VARIOUS METHODS OF HORN FLY CONTROL IN BEEF CATTLE. Miss. Agric. Exp. Stn. Bull. No. 707, 7 pp.

305. EVANS, J. W. 1952. THE INJURIOUS INSECTS OF THE BRITISH COMMONWEALTH (EXCEPT THE BRITISH ISLES, INDIA, AND PAKISTAN) WITH A SECTION ON THE CONTROL OF WEEDS BY INSECTS. Commonw. Inst. Entomol., pp. 23, 29, 36.

306. FABRICIUS, J. C. 1794. ENTOMOLOGICA SYSTEMATICA EMENDATA ET AUCTA. Vol. 4, 472 pp. Hafniae (=Copenhagen).
Describes *Stomoxys pungens* (= *H. irritans*).

307. FAIRCHILD, G. B., 1943. AN ANNOTATED LIST OF THE BLOOD-SUCKING INSECTS, TICKS, AND MITES KNOWN FROM PANAMA. Am. J. Trop. Med. Hyg. 23: 576.

Introduction and spread of horn fly (1938) discussed. May be possible vector of a trypanosomal disease of cattle.

308. FELT, E. P. 1898. THE PLAGUE OF FLIES. Country Gentleman, Sept. 8, p. 712.

309. FERGUSON, E. W. 1926. THE DISTRIBUTION OF INSECTS CAPABLE OF CARRYING DISEASE IN EASTERN AUSTRALIA. Pan-Pac. Sci. Congr., Aust., Proc. 1923. 2: 1477-1486.

310. FERNALD, C. H. 1894. THE HORN FLY. Hatch Exp. Stn., Mass. Agric. Coll. Bull. 24, pp. 11-15.

Recommended *Spalangia haematobiae*, a parasite of the horn fly, be propagated and released for horn fly control.

311. FERRAR, P. 1969a. COLONISATION OF AN ISLAND BY THE BUFFALO FLY, "HAEMATOBIA EXIGUA." Aust. Vet. J. 45: 290-292.

Fly-free cattle were put on an island where no other cattle had been for 26 weeks. The cattle became infested with buffalo flies which probably came from a town 4½ miles away.

312. ——— 1969b. COLONISATION OF AN ISLAND BY THE BUFFALO FLY, "HAEMATOBIA EXIGUA." J. Aust. Entomol. Soc. 7: 158-162.

Same as above.

313. FERRIERE, C. 1933. NOTE SUR LES PARASITES DE "LYPEROSIA EXIGUA" DE MEIJ. Rev. Suisse Zool. 40(34): 637-643.

Lists eight parasites of the buffalo fly.

314. FIASSON, R. 1943. NOTES SUR LES PARASITES ANIMAUX DU HAUT-APURE (VENEZUELA). Rev. Sci. med. Afr. franc. libre. 2(2): 125-151.

Reported that the horn fly, introduced to Venezuela from Colombia, had become a serious pest of cattle.

315. ——— 1948. LA "LYPEROSIA" (I.E. "SIPHONA") "IRRITANTS" (LINNEO, 1758) O MOSCA DEL GANADO. Rev. Gran-colomb. de Zootec. Hig. y Med. Vet. 2: 724-738.

316. FISHER, E. H. 1955. A DAIRY-BARN FOGGING METHOD FOR FLY CONTROL. J. Econ. Entomol. 48(3): 330.

Horn flies and other flies associated with barns and cattle were controlled by deodorized kerosene fog containing piperonyl butoxide and pyrethrins.

317. ——— 1959. SYMPOSIUM ON FLY CONTROL. FLY CONTROL FOR THE DAIRY HERD. Chem. Spec. Assoc. Midyr. Meeting. 45: 125-126.
Barn fogging was used as a method of horn fly control.
318. FITCH, C. P. 1918. ANIMAL PARASITES AFFECTING EQUINES. J. Am. Vet. Med. Assoc. 53 (N.S.6), No. 3: 312-330.
Horn fly sometimes found on horses.
319. FLETCHER, J. 1892a. INJURIOUS INSECTS. Farmers Advocate (London, Ontario), pp. 18, 58, 147, 198, 231, 308, 348, 395, 439, 479.
320. ——— 1892b. THE HORN-FLY. Central Exp. Farm, Canada, Bull. 14, 11 pp.
321. ——— 1893. THE HORN-FLY. Entomol. Soc. Ont. Annu. Rep. 1892: 49-53.
First appearance and life history of horn fly in Canada discussed.
322. ——— 1894. REPORT OF THE ENTOMOLOGIST AND BOTANIST. Exp. Farms, Canada, Rep. 1893: 157-193.
323. ——— 1897. REPORT OF THE ENTOMOLOGIST AND BOTANIST. Exp. Farms, Canada, Rep. 1896: 226-276.
324. ——— 1904. ENTOMOLOGY AND BOTANY IN AGRICULTURE. Comm. Agric. Colon. Canada, Rep. 1904: 57-83.
325. ——— 1904. INSECTS INJURIOUS TO ONTARIO CROPS IN 1903. Entomol. Soc. Ont. Annu. Rep. 34 (1903): 62-63.
Also found in Entomol. Rec. 1903. (Op. cit., p. 99.)
Records spread of horn fly across Canada to British Columbia.
326. FLETCHER, T. B. 1917. REPORT OF THE IMPERIAL PATHOLOGICAL ENTOMOLOGIST. Sci. Rep. Agric. Res. Inst., Pusa, 1916-17, pp. 91-102.
Lyperosia minuta was recovered from dung at Calcutta, India.

327. FRANCIS, E. 1914. AN ATTEMPT TO TRANSMIT POLIOMYELITIS BY THE BITE OF "LYPEROSIA IRRITANS." J. Infect. Dis. 15(1): 1-5.

Polio virus could not be transmitted under lab conditions to monkeys.

328. FRANKS, R. E., E. C. BURNS, and N. C. ENGLAND. 1964. COLOR PREFERENCE OF THE HORN FLY, "HAEMATOBIA IRRITANS" ON BEEF CATTLE. J. Econ. Entomol. 57(3): 371-372.

More horn flies were found on dark- than light-colored cattle.

329. FREEBORN, S. B., and W. M. REGAN. 1932. FLY SPRAYS FOR DAIRY COWS—A PROGRESS REPORT. J. Econ. Entomol. 25(2): 167-174.

Various fly sprays were tested against the horn fly; average horn fly control was obtained by use of the sprays. A milk loss of more than 1.4 percent could not be obtained by caging horn flies with the dairy cattle.

330. ——— W. M. REGAN, and A. H. FOLGER. 1925. THE RELATION OF FLIES AND FLY SPRAYS TO MILK PRODUCTION. J. Econ. Entomol. 18(6): 779-790.

Cattle confined for 1 month in a barn with a heavy infestation of horn flies showed a total milk loss of 1.4 percent; infestation of house flies produced a loss of 3.33 percent; and a loss of 9.26 percent was caused by an infestation of stable flies. An average of 210 horn flies per animal was responsible for the 1.4 percent milk loss; from a commercial standpoint this loss was negligible.

331. ——— W. M. REGAN, and A. H. FOLGER. 1928. THE RELATION OF FLIES AND FLY SPRAYS TO MILK PRODUCTION. J. Econ. Entomol. 21(3): 494-501.

Exposing cattle to heavy infestations of house flies did not lower production. Spraying caused losses in production of milk; often losses were greater as a result of spray usage than the presence of flies. Oil-based sprays raised the body temperature of the cattle.

332. FRYER, H. C., A. O. SHAW, R. W. ATKINSON, and others. 1943. TESTS OF FLY REPELLENTS OF KNOWN INGREDIENTS

AND OF SELECTED COMMERCIAL SPRAYS ON DAIRY CATTLE.
J. Econ. Entomol. 36(1) : 23-32.

Horn fly was easily repelled by all of the compounds tested.

333. FULLAWAY, D. T. 1917. DESCRIPTION OF A NEW SPECIES OF "SPALANGIA." Hawaii. Entomol. Soc. Proc. 3(4) : 292-294.

Described *S. philippiensis*, which was introduced from the Philippines to control horn fly.

334. ——— 1920. THE HORN FLY PROBLEM. Hawaii. Forest Agric. 17(6) : 166-167.

Discussed control of the horn fly using biological control methods.

335. ——— 1921. HORN FLY CONTROL. Hawaii. Forest. Agric. 18(10) : 219-221.

Discussed control of horn fly using imported dung beetles.

336. ——— 1923. REPORT OF THE ENTOMOLOGIST. Hawaii. Bd. Aric. Forest. Rep. Bien. Period Ended Dec. 31, 1922.

Record of species of parasites imported to combat the horn fly; more emphasis was given to the coprophagous insects because destruction of the dung was believed to be the key to horn fly control.

337. GALLAGHER, B. A. 1928. SPECIAL REPORT ON HORN FLY EXPERIMENT. Hawaii. Forest. Agric. 25(3) : 144-146.

Various compounds were added to the food and water fed to cattle with hopes of controlling the horn fly. All compounds failed.

338. GAMAL-EDDIN, F. M. 1962a. HORN FLIES ("SIPHONA IRRITANS" LIN.), (DIPTERA: MUSCIDAE) AS PROBABLE AGENTS OF THE ONSET OF INFESTATION OF BUFFALOS WITH HAEMATOPINID LICE (SIPHUNCULATA: HAEMATOPINIDAE). Arab Vet. Med. Assoc. J. 22(4) : 361-364.

S. irritans was a carrier of *Haematopinus* nymphs, especially during the cold months. Horn fly may play major role in disseminating lice among buffalos.

339. ——— 1962b. ON THE OVERWINTERING OF TWO BLOOD-SUCKING FLIES ("MUSCA CRASSIROSTRIS," STEIN AND "SIPHONA IRRITANS" LIN.) IN EGYPT. (DIPTERA: MUSCIDAE). Arab Vet. Med. Assoc. J. 22(4): 351-359.

Horn fly oviposited in open areas in November and December; oviposition found to occur during cold months of the year. Horn fly was found to overwinter in the egg stage.

340. ——— 1962c. "SIPHONA IRRITANS" LIN., A NEW RECORD TO EGYPT, WITH A COMPREHENSIVE NOTE ON ITS BIOLOGY. Arab Vet. Med. Assoc. J. 22(2): 151-154.

Biology and history of the horn fly in Egypt. Horn fly found to have only one annual peak of seasonal abundance; prefers buffalo for feeding and cow dung for breeding.

341. GARDINER, J. G. 1946. LIVESTOCK INSECT INVESTIGATIONS. Rep. Min. Agric. Dominion Canada, Year Ended Mar. 31, 1946, p. 116.

342. ——— 1951. INSECT PESTS OF LIVESTOCK AND MAN. Rep. Min. Agric. Canada, Year Ended Mar. 31, 1951, p. 12.

343. GARMAN, H. 1892. SOME COMMON PESTS OF THE FARM AND GARDEN. Ky. Agric. Exp. Stn. Bull. No. 40, pp. 10-12. Also found in Ky. Agric. Exp. Stn. Annu. Rep. 5 (1894): 43-88.

344. GENEL, M. R., and D. BARNES. 1953. CONTROL DE LAS MOSCAS EN LOS ESTABLOS. Mex. Secr. Agric. Ganad. Estud. Espec. Foll. Divulgacion 13: 5-29.

345. GENTRY, S. 1947a. INSECT AND LIVESTOCK PARASITE CONTROL. Vet. Med. 42: 184-186.

346. ——— 1947b. MATERIAL USED FOR PARASITE AND INSECT CONTROL. Iowa Vet. 18(3): 12-15.

347. GESSELL, S. G. 1954. COWS DO THE SPRAYING HERE. Pa. Farmer 150(7): 36.

348. GIBSON, A. 1923. INSECTS AFFECTING MAN AND DOMESTIC

ANIMALS. Can. Dep. Agric. Rep. Dom. Entomol. 1919 and 1920, pp. 24-25.

349. GILES, W. L. 1959. Delta Stn. Annu. Rep., Stoneville. Miss. Farm Res. 22(9) : 6, 8.

Korlan, Co-Ral used to control horn flies on sheep and cattle. Combination of spray and backrubber was better than either method alone.

350. GILRUTH, J. A. 1912. REPORT ON DOMESTICATED ANIMALS IN THE NORTHERN TERRITORIES. Bull. North. Terr. Aust. No. 1 : 27.

351. GINGRICH, R. E. 1965. "BACILLUS THURINGIENSIS" AS A FEED ADDITIVE TO CONTROL DIPTEROUS PESTS OF CATTLE. J. Econ. Entomol. 58(2) : 363-364.

Horn fly was controlled when *B. thuringiensis* was added to cattle feed; may be an effective method of controlling dung-breeding insects.

352. ——— and J. L. ESCHLE. 1966. PRELIMINARY REPORT ON THE LARVAL DEVELOPMENT OF THE HORN FLY, "HAEMATOBIA IRRITANS," IN FECES FROM CATTLE GIVEN FRACTIONS OF A COMMERCIAL PREPARATION OF "BACILLUS THURINGIENSIS." J. Invertebr. Pathol. 8(2) : 285-287.

B. thuringiensis was broken down into an aqueous extract and insoluble bacteria product. Each part was equally toxic to the horn fly, but when the two parts were mixed, a higher toxicity resulted.

353. ——— and J. L. ESCHLE. 1971. SUSCEPTIBILITY OF IMMATURE HORN FLIES TO TOXINS OF "BACILLUS THURINGIENSIS." J. Econ. Entomol. 64(5) : 1183-1187.

Major larvacidal activity against horn fly using *B. thuringiensis* was in the water-insoluble faction. Toxins fed to cattle were excreted in the feces and active against immature horn flies; spores and crystals were ineffective against horn fly larvae.

354. GLASER, R. W. 1922a. A STUDY OF "TRYPANOSOMA AMERICANUM." J. Parasitol. 8(3) : 136-144.

Horn fly may be able to transmit *T. americanum*, but results of experiments were negative.

355. ——— 1922b. "HERPETOMONAS MUSCAE-DOMESTICAE," ITS BEHAVIOR AND EFFECT IN LABORATORY ANIMALS. *J. Parasitol.* 8(3) : 99-108.

House flies were found feeding at punctures made by horn fly.

356. ——— 1923. THE SURVIVAL OF BACTERIA IN THE PUPAL AND ADULT STAGES OF FLIES. *Am. J. Hyg.* 3(4) : 469-480.

Pupae of horn fly contained very few bacteria; few bacteria were found in intestinal tract of newly emerged adults.

357. ——— 1924a. REARING FLIES FOR EXPERIMENTAL PURPOSES WITH BIOLOGICAL NOTES. *J. Econ. Entomol.* 17(3) : 486-496.

Horn fly could not be reared beyond first generation of adults.

358. ——— 1924b. THE RELATION OF MICROORGANISMS TO THE DEVELOPMENT AND LONGEVITY OF FLIES. *Am. J. Trop. Med.* 4(1) : 85-107.

Micro-organisms were not absolutely necessary for the normal growth and development of the horn fly and other Diptera tested.

359. GNEDINA, M. P., and A. N. OSIPOV. 1960a. ABOUT BIOLOGY OF PARAFILARIASIS VECTOR IN HORSES. (In Russian.) *Veterinariya* 8: 49-50.

Haematobia atripalpis was the vector.

360. ——— and A. N. OSIPOV. 1960b. CONTRIBUTIONS TO THE BIOLOGY OF THE NEMATODE "PARAFILARIA MULTIPAPILLOSA" (CONDAMINE ET DROUILLY, 1878) PARASITIC IN THE HORSE. (In Russian.) *Helminthologia* 2(1) : 13-16.

361. ——— and A. N. OSIPOV. 1960c. ON THE WAY TO DECIPHER THE DEVELOPMENT CYCLE OF THE NEMATODE "PARAFILARIA MULTIPAPILLOSA" (CONDAMINE ET DROUILLY, 1878) PARASITIC OF THE HORSE. (In Russian.) *Dokl. Akad. Nauk SSSR.* 131(5) : 1219-1221.

362. GOODHUE, L. D. 1946. AEROSOLS AND THEIR APPLICATION.

J. Econ. Entomol. 39(4) : 506-509.

Aerosols in general were effective against the horn fly.

363. GOODWIN, W. J. 1956a. TOXICITY OF DIAZINON VAPORS TO HORN FLIES. J. Econ. Entomol. 49(3) : 406-407.

Diazinon vapors in barns were highly toxic to horn flies.

364. ——— 1956b. TOXICITY OF DIAZINON VAPORS TO HORN FLIES. (Abstract). Assoc. South. Agric. Workers Proc. 53: 144.

365. ——— 1956c. CONTROL OF HORN FLIES ON CATTLE WITH TREATED RUBBING DEVICES. J. Econ. Entomol. 49(3) : 407-408.

Rubbing devices were effective in controlling horn flies on beef and dairy herds. DDT was main insecticide used.

366. ——— 1956d. CONTROL OF HORN FLY ON CATTLE WITH THE USE OF TREATED RUBBING DEVICES. (Abstract). Assoc. South. Agric. Workers Proc. 53: 143.

367. ——— 1956e. TREATED SELF-RUBBING DEVICES FOR CONTROL OF HORN FLIES AND LICE ON CATTLE. S.C. Agric. Exp. Stn. Circ. 107, 8 p.

368. ——— 1956f. FOR CATTLE . . . SELF-RUBBING DEVICES FOR HORN FLY CONTROL. S.C. Agric. Res. 3(2) : 6.

369. ——— 1956g. ENTOMOLOGY AND ZOOLOGY. S.C. Agric. Exp. Stn., Clemson Agric. Coll. Annu. Rep. 68(1956) : 34, 37.

370. ——— S. MOORE, and H. H. SCHWARDT. 1954. HORSE FLY AND HORN FLY REPELLENT TESTS ON CATTLE IN NEW YORK. J. Econ. Entomol. 46(6) : 1088-1089.

Four emulsion sprays were tested for repellency of horn fly; pyrenone was best repellent.

371. ——— M. J. SLOAN, and H. H. SCHWARDT. 1952. REPELLENCY TEST FOR HORSE FLIES AND HORN FLIES IN NEW YORK STATE. J. Econ. Entomol. 45(1) : 121-122.

Pyrenone was most effective repellent.

372. GOULDING, R. L., and L. C. TERRIERE. 1959. MALATHION RESIDUES IN MILK OF DAIRY COWS TREATED FOR HORN FLY CONTROL. *J. Econ. Entomol.* 52(2) : 341.

Malathion dust (4 percent) found to leave no residue in the milk. Residues in milk found if 10 percent dust or 0.5 percent wettable powder was used. Treatment was necessary every 9 to 14 days to keep fly populations down.

373. GRAHAM, O. H., and R. O. DRUMMOND. 1967. THE POTENTIAL OF ANIMAL SYSTEMIC INSECTICIDES FOR ERRADI-CATING CATTLE GRUBS, *HYPODERMA* SPP. *J. Econ. Entomol.* 60(4) : 1050-1053.

Systemics will also control horn flies and face flies.

374. GRANETT, P., and E. J. HANSENS. 1956. THE EFFECT OF BITING FLY CONTROL ON MILK PRODUCTION. *J. Econ. Entomol.* 49(4) : 465-467.

Milk production increased as flies were controlled.

375. ——— and E. J. HANSENS. 1957. FURTHER OBSERVATIONS ON THE EFFECT OF BITING FLY CONTROL ON MILK PRODUCTION ON CATTLE. *J. Econ. Entomol.* 50(3) : 332-336.

Control of flies increased milk production; cattle were sprayed weekly. Spraying twice a week gave similar results. Poor control was obtained with insecticidal dusts.

376. ——— E. J. HANSENS, and C. T. O'CONNOR. 1955. AUTOMATIC CATTLE SPRAYERS FOR FLY CONTROL IN NEW JERSEY. *J. Econ. Entomol.* 48(4) : 386-389.

Sprayer with an effective spray formulation was an effective labor-saving device in treating dairy cattle for horn flies.

377. ——— and H. L. HAYNES. 1955. USE OF CYCLETHRIN IN LIVESTOCK SPRAYS FOR CONTROL OF FLIES. *J. Econ. Entomol.* 48(4) : 409-412.

Good daily protection was provided against horn flies when sprayed after milking. More Cyclethrin ($1\frac{1}{2}$ to 2 times) was needed as pyrethrins.

378. ——— H. L. HAYNES, and R. W. HELM. 1951. FURTHER

EVALUATION OF BUTOXYPOLYPROPYLENE GLYCOL AS A FLY REPELLENT FOR DAIRY CATTLE. J. Econ. Entomol. 44(1): 97-102.

Treatment with BPPG was effective for 1 day and superior to treatment with pyrethrins.

379. ——— H. L. HAYNES, D. P. CONNOLA, and others. 1949. TWO BUTOXYPOLYPROPYLENE GLYCOL COMPOUNDS AS FLY REPELLENTS FOR LIVESTOCK. J. Econ. Entomol. 42(2): 281-286.

Compounds showed promise as repellents for the horn fly in a 10 percent concentration in oil or water; they possessed low toxicity to mammals, were not irritating, and were synergists for pyrethrum.

380. GRAYBILL, H. W. 1914. REPELLENTS FOR PROTECTING ANIMALS FROM ATTACKS OF FLIES. U.S. Dep. Agric. Bull. 131.

381. GRÜNBERG, K. 1906. UBER BLUTSAUGENDE MUSCIDEN. Zool. Anz. 30: 78-82.

Descriptions and location of type specimens of various species of *Haematobia* discussed.

382. HADWEN, S. 1914. NOTES ON THE LIFE HISTORIES OF BLOOD-SUCKING DIPTERA OF BRITISH COLUMBIA, WITH SPECIAL REFERENCE TO THE TABANIDAE. Entomol. Soc. Br. Columbia. No. 4. N. S. Proc., pp. 46-49.

Horn fly appeared in British Columbia about mid-April.

383. ——— 1923. THE HORN FLY. Entomology Bull. Can. Dep. Agric. No. 24, pp. 9-10.

384. ——— 1928. FLY ATTACK AND ANIMAL COLORATION. 4th Int. Congr. Entomol., Ithaca, N.Y., Trans. 1928: 199-202.

Horn flies preferred dark-colored hair over light-colored hair; found to stay on host in darkness; and found to rest on the ends of the hairs to get as far away as possible from the body heat of the host.

385. HAFEZ, M. 1939. SOME ECOLOGICAL OBSERVATIONS ON THE INSECT FAUNA OF DUNG. Bull. Soc. Fouad. Entomol. 23: 241-287.

Haematobia was incorrectly labeled as a dung visitor rather than a dung breeder. Moisture content of various types of dung discussed. Experiments on aging dung and insects, oviposition on various dung types, and attraction of flies to dung were carried out.

386. ——— and F. M. GAMAL-EDDIN. 1962a. ON THE FEEDING HABITS OF "MUSCA CRASSIROSTRIS" AND "SIPHONA IRRITANS" IN EGYPT, WITH SPECIAL REFERENCE TO THEIR BITING CYCLE IN NATURE. Bull. Soc. Entomol. Egypte, vol. 46.

387. ——— and F. M. GAMAL-EDDIN. 1962b. ON THE DIURNAL RHYTHM AND SEASONAL VARIATION OF THE HORN FLY "SIPHONA IRRITANS" (LIN.) IN EGYPT. Bull. Soc. Entomol. Egypte, vol. 46.

388. ——— and F. M. GAMAL-EDDIN. 1964. ON THE DIURNAL RHYTHM AND SEASONAL VARIATIONS OF THE HORN FLY, "SIPHONA IRRITANS" (L.), IN EGYPT (DIPTERA: MUSCIDAE). Bull. Soc. Entomol. Egypte 47(1963): 117-124.

Peak seasonal abundance was in May, with a rapid falling off in numbers from June to a minimum in October, followed by a gradual rise until February and then a rapid rise to the May population peak.

389. HAMMER, O. 1941. BIOLOGICAL AND ECOLOGICAL INVESTIGATIONS ON FLIES ASSOCIATED WITH PASTURING CATTLE AND THEIR EXCREMENT. Vidensk. Medd. Dan. Naturhist. Foren. Kbh. 105: 1-257.

Excellent study on the ecology of cow dung and dung insects. Various temperature studies, insect succession on dung, and life histories of dung inhabiting insects were explained.

390. HAMMOND, G. H. 1948. PESTS OF LIVESTOCK AND MAN. Can. Insect Pest. Rev. 26: 85.

391. HANDSCHIN, E. 1932. A PRELIMINARY REPORT ON INVESTIGATIONS ON THE BUFFALO FLY ("LYPEROSIA EXIGUA" DE MEIJ.) AND ITS PARASITES IN JAVA AND NORTHERN AUSTRALIA. With appendix by Lillian F. Graham. Counc. Sci. Ind. Res. Aust. Pamp. 31, pp. 1-24.

Discussed bio-control of buffalo fly with parasites; several species of parasites were considered promising enough to be introduced to Australia.

392. ——— 1933a. NOTIZEN UBER DIE BIOLOGIE DER VON DR. FERRIERE BESTIMMTEN "LYPEROSIA"-PARASITEN. Rev. Suisse Zool. 40 (34) : 643-644.

Spalangia was found to be far more important than any other genus which parasitized *Lyperosia*.

393. ——— 1933b. DEW ROLLS VON TEMPERATUR UND FEUCHTIGKEIT IN AUFTRETEN UND IN DER VERBREITUNG VON "LYPEROSIA EXIGUA" DE MEIJ. Dept. Landbowv Nyverheid en Handels. Veeartsenijk. Meded 80 : 23-33.

Temperature and humidity limit distribution of buffalo fly; fly populations wane during dry period, climb in wet periods.

394. ——— 1933c. BEITRAGE ZUR BIOLOGIE DER BUFFELFLIEGE ("LYPEROSIA EXIGUA" DE MEIJ.) UND IHRER PARASITEN. Rev. Suisse Zool. 40 (8) : 187-200.

Various parasites of the buffalo fly were introduced into Australia.

395. ——— 1933d. STUDIEN ON "LYPEROSIA EXIGUA" DE MEIJERE UND IHREN PARASITEN. I. TEIL. "LYPEROSIA EXIGUA" IN JAVA UND NORDAUSTRALIEN. Rev. Suisse Zool. 40 (30) : 449-528.

All stages of the fly described; fly development took 7 to 20 days at temperatures of 71.6° - 104° F. Interruption of fly development occurs when average temperature falls below 68°. Buffalo fly found to be attracted to fresh dung, water content must be at least 65 percent. Damage caused by fly has been overestimated.

396. ——— 1934. STUDIEN AN "LYPEROSIA EXIGUA" DE MEIJERE UND IHREN PARASITEN. II. TEIL. DIE NATURLICHEN FEINDE VON "LYPEROSIA." Rev. Suisse Zool. 41 (1) : 1-71. III. TEIL. DIE ANZIEHUNG VON "SPALANGIA" ZU IHREM WIRTE. T. c. (14) : 267-297.

Studies of buffalo fly and its natural enemies. Next to *Spalangia* the most important pupal parasites were *Aleochara handschini* and *A. windredi*.

397. HANSENS, E. J. 1948. FLY CONTROL IN DAIRY BARNs. Rutgers Univ. Agric. Coll. Ext. Serv. Leaf. 20, 4 pp.

398. ——— 1949. FLY CONTROL IN DAIRY BARNs. Rutgers Univ. Agric. Coll. Ext. Serv. Leaf. 33, 2 pp.

399. ——— 1956. CONTROL OF HOUSE FLIES IN DAIRY BARNs WITH SPECIAL REFERENCE TO DIAZINON. J. Econ. Entomol. 49(1) : 27-32.

Horn flies were controlled for 2 months in barns sprayed with diazinon; vapors found toxic to flies.

400. ——— and F. C. SWIFT. 1963. FLY CONTROL RECOMMENDATIONS N.J. State Agric. Coll. Ext. Leaf. 353, 6 pp.

401. HARGETT, L. T. 1962. VISUAL AND OLFACTORY RESPONSES OF THE HORN FLY, "HAEMATOBIA IRRITANS." Diss. Abstr. Oreg. State Univ. 22(10) : 3784-3785.

Responses of horn fly to different colored cattle, various shapes, and odors were tested.

402. ——— and R. L. GOULDING. 1962a. STUDIES ON THE BEHAVIOR OF THE HORN FLY, "HAMATOBIA IRRITANS" (LINN.). Oreg. State Univ. Agric. Exp. Stn. Tech. Bull. 61, pp. 1-27.

Adult horn flies were able to distinguish visually between a steer and a control area with a common background at a distance of 12 feet. Response threshold of the fly to white light was less than 0.004 foot-candles; maximum response was obtained with an intensity of 1.1 foot-candles and above. Flies reacted strongly to UV light and violet light, almost as strongly to blue and green light. Horn flies were attracted to areas of contrast. Bovine hair was also attractive as was the smell of the cattle. Horn fly was negatively geotrophic.

403. ——— and R. L. GOULDING. 1962b. REARING THE HORN FLY, "HAEMATOBIA IRRITANS." J. Econ. Entomol. 55(4) : 565-566.

Method of rearing flies using live cows and fresh manure from the cows was discussed. One cow was able to support 10,000 flies.

404. ——— and E. C. TURNER. 1957. HORN FLY CONTROL BY THE USE OF DUSTS IN SELF-APPLICATING DEVICES. (Abstract) Bull. Entomol. Soc. Am. 3(3) : 34.
405. ——— and E. C. TURNER. 1958. HORN FLY CONTROL BY USE OF INSECTICIDAL DUSTS IN SELF-APPLICATING DEVICES. J. Econ. Entomol. 51(6) : 795-798.
- Various insecticidal dusts were used in cable-type backrubbers for horn fly control on beef cattle. A special backrubber was constructed to control flies on dairy cattle. Backrubbers treated with insecticides diluted in oil were used as a standard. Successful control was obtained using insecticidal dusts in self-applicating devices.
406. HARGREAVES, E. 1923. ENTOMOLOGICAL NOTES FROM TARANTO, ITALY, WITH REFERENCES TO FAENZA, DURING 1917 AND 1918. Bull. Entomol. Res. 14(2) : 213-219.
- Small numbers of the horn fly were reported as present in Italy.
407. HARRINGTON, W. H. 1899. NOTES ON INSECTS OF THE YEAR, DIVISION NO. 1 OTTAWA DISTRICT. Entomol. Soc. Ont. Annu. Rep. 29(1898) : 89.
- Horn fly was found increasing in numbers.
408. HARRIS, R. L. 1962. LABORATORY COLONIZATION OF THE HORN FLY, "HAEMATOBIA IRRITANS" (L.). Nature (Lond.) 196(4850) : 191-192.
- Various diets were used to nourish horn flies in the laboratory; these included mixtures of blood, beef juice, saline, and antibiotics.
409. ——— 1964. LABORATORY TESTS TO DETERMINE SUSCEPTIBILITY OF ADULT HORN FLY AND STABLE FLY TO INSECTICIDES. J. Econ. Entomol. 57(4) : 492-494.
- Organophosphorus insecticides were more effective than chlorinated hydrocarbons against the two fly species.
410. ——— and E. D. FRAZAR. 1966. CHEMOSTERILIZATION OF ADULT HORN FLIES. J. Econ. Entomol. 59(5) : 1171-1173.

Apholate, tepa, and an aziridinyI benzoquinone compound induced sterility in adult male and female horn flies when applied topically or mixed with the diet. Sterilized males were not as competitive as untreated flies.

411. ——— and E. D. FRAZAR. 1970. INTAKE OF BLOOD BY ADULT HORN FLIES REARED IN THE LABORATORY. *Ann. Entomol. Soc. Am.* 63(5): 1475-1476.

412. ——— E. D. FRAZAR, and O. H. GRAHAM. 1966. RESISTANCE TO RONNEL IN A STRAIN OF HORN FLIES. *J. Econ. Entomol.* 59(2): 387-390.

Resistance to Ronnel was intensified in a laboratory colony of horn flies by exposing flies to insecticide for 18 in 28 generations and rearing each succeeding generation from the survivors. A strain was developed that tolerated 50 times more Ronnel than susceptible flies.

413. ——— E. D. FRAZAR, and P. D. GROSSMAN. 1967. ARTIFICIAL MEDIA FOR REARING LARVAE OF HORN FLIES. *J. Econ. Entomol.* 60(3): 891.

Horn flies were reared on a mixture of sugar cane pulp, wheat flour, dehydrated bovine plasma, sodium bicarbonate, and water. Little difference existed between flies reared on manure and flies reared on the sugarcane diet.

414. ——— E. D. FRAZAR, and C. D. SCHMIDT. 1968. NOTES ON THE MATING HABITS OF THE HORN FLY. *J. Econ. Entomol.* 61(6): 1639-1640.

Horn flies mated as early as 2 days after emergence; the males inseminated an average of 4.6 females. The female appeared monogamous.

415. ——— O. H. GRAHAM, and W. C. McDUFFIE. 1965. RESISTANCE OF LIVESTOCK INSECTS TO INSECTICIDES IN THE UNITED STATES. *Agric. Vet. Chem.* 6(3): 78-81.

Horn fly found to be resistant to Ronnel.

416. ——— R. A. HOFFMAN, and E. D. FRAZAR. 1965. CHILLING VS. OTHER METHODS OF IMMOBILIZING FLIES. *J. Econ. Entomol.* 58(2): 379-380.

Chilling worked well on horn flies.

417. ——— and J. A. MILLER. 1969. A TECHNIQUE FOR STUDYING THE FEEDING HABITS OF THE HORN FLY. *J. Econ. Entomol.* 62(1): 279-280.

Description of a "Bitometer." Average feeding time for two virgin females was 14.3 min per day with the average frequency of feeding at 12 times per day.

418. ——— J. A. MILLER, and E. D. FRAZAR. 1971. ECLOSION OF HORN FLIES UNDER LABORATORY CONDITIONS. *Ann. Entomol. Soc. Am.* 64(1): 224-228.

Eclosion followed a circadian rhythm. When lab-reared pupae were held at 27° C most flies emerged between 1200 to 0400 hrs. When similar pupae were held outside or with simulated outside temperature and light, most flies emerged between 1500 to 0100 hrs. Variations in temperature influenced the rhythm, but time of oviposition did not. Female flies usually emerged before the male flies.

419. HARVEY, F. L. 1892. REPORT OF THE BOTANIST AND ENTOMOLOGIST. *Maine Agric. Exp. Stn. Annu. Rep.* 1892 (pt. 4): 99-146.

420. HARVEY, T. L., and J. R. BRETHOUR. 1970. HORN FLY CONTROL WITH DICHLORVOS-IMPREGNATED STRIPS *J. Econ. Entomol.* 63(5): 1688-1689.

Impregnated resin strips were attached to ears or hung around the necks of cattle. Horn fly control varied from 1 to 4 weeks with no adverse reactions to the cattle.

421. ——— and D. G. ELY. 1968. PARTIAL HERD TREATMENT WITH CROTOXYPHOS IN WAX-BARS TO CONTROL HORN FLIES. *J. Econ. Entomol.* 63(2): 671-672.

Control of horn flies infesting a herd of cattle was obtained by treating 6 to 33 percent of the cattle within the herd.

422. ——— and D. G. ELY. 1969. WAX-BAR APPLICATIONS OF CIODRIN FOR HORN FLY CONTROL. *J. Econ. Entomol.* 62(6): 1386-1388.

Wax-bar applications of Ciodrin were more effective than Ciodrin sprays against horn flies.

423. HASEMAN, L. 1927. CONTROLLING HORN AND STABLE FLIES. Mo. Agric. Exp. Stn. Bull. No. 254, 10 pp.

Fifty percent more horn flies were counted on dark-colored than light-colored cows.

424. ——— 1929. OUR FARM PESTS. Mo. Farmer 21(16): 11.

425. ——— G. D. JONES, and C. W. WINGO. 1946. INSECT CONTROL WITH DDT. Mo. Agric. Exp. Stn. Circ. No. 309, p. 3.

426. ——— P. C. STONE, C. W. WINGO, and R. W. PORTMAN. 1951. SERVING MISSOURI AGRICULTURE. Mo. Agric. Exp. Stn. Annu. Rep. 1949-50. CONTROL OF FLIES ON DAIRY ANIMALS AND IN DAIRY BARNS. Mo. Agric. Exp. Stn. Bull. No. 556, pp. 77-78.

427. HAUFE, W. O., and H. V. MORLEY. 1970. RESIDUES IN CATTLE TREATED WITH DDT FOR CONTROL OF HORN FLIES ON PASTURE. Bull. Environ. Contam. Toxicol. 5(5): 389-396.

428. ——— and C. O. M. THOMPSON. 1964. WEIGHT CHANGES IN CATTLE ON DRY RANGE IN RELATION TO CHEMICAL TREATMENTS FOR FLY CONTROL. Can. J. Anim. Sci. 44: 272-280.

Treated cattle did not gain weight as rapidly as the untreated cattle.

429. HAWKINS, J. H. 1956. DAIRY FARMERS CAN CONTROL FLY PESTS. Maine Farm Res. 4(1): 3-9.

430. HAYES, B. W., M. J. JANES, and D. W. BEARDSLEY. 1969. CONTROL OF HORN FLIES AND GRUBS. Fla. Everglades Exp. Stn. Mimeo Rep. EES69-12, 7 pp.

431. HAYNES, H. L. 1954. REPELLENTS FOR USE ON LIVESTOCK. Proc. 8th Annu. Meeting North Cent. States Br. Entomol. Soc. Am.

432. ——— H. R. GUEST, H. A. STANSBURY, and others. 1954. CYCLETHRIN, A NEW INSECTICIDE OF THE PYRETHRINS-TYPE. Boyce Thompson Inst. Contrib. 18(1): 1-16.

Horn fly control with Cyclothrin was little better than pyrethrin.

433. ——— H. R. GUEST, H. A. STANSBURY, and others. 1955. CYCLETHRIN; A NEW SYNTHETIC INSECTICIDE SAID TO BE MORE READILY SYNERGIZED BY THE COMMON PYRETHRIN SYNERGISTS THAN ALLETHRIN. *Soap Chem. Spec.* 31(2): 141, 143, 147, 151, 160-161; (3): 185, 187, 191, 195, 197.
More Cyclethrin (1.6 to 1.7 times) was needed to control horn flies than pyrethrins.
434. ——— and R. E. MCKENZIE. 1954. EVALUATIONS OF METHODS FOR CONTROL OF FLIES ON LIVESTOCK. *Annu. Meeting Chem. Spec. Mfr. Assoc. Proc.* 41(1954): 113-117.
Sprayed cattle produced more milk and gained more weight than unsprayed cattle.
435. HAYS, K. L. 1959a. KORLAN FOR CONTROL OF THE HORN FLY. *Down Earth*, Spring 1-2.
Excellent horn fly control was obtained from use of Korlan applied by backrubber and as a spray.
436. ——— 1959b. NEW INSECTICIDES FOR CONTROL OF THE HORN FLY, "SIPHONA IRRITANS" (L.). (Abstract.) *Assoc. South Agric. Workers Proc.* 56: 130.
437. ——— 1959c. BACKRUBBERS—CHEAP AND EASY METHOD OF CONTROLLING LIVESTOCK PESTS. *Highlights Agric. Res.* 6(1).
438. ——— 1959d. SEVIN, A CARBAMATE INSECTICIDE, FOR CONTROL OF THE HORN FLY, "SIPHONA IRRITANS" (L.). *Stn. Res. News* 5(2): 3-4.
439. ——— 1960. BACKRUBBERS, EASY METHOD OF CONTROLLING LIVESTOCK PESTS. *Cyanagrams* 7: 17-20.
440. ——— and V. L. BROWN. 1969. DUSTING STATIONS FOR HORN FLY CONTROL ON BEEF CATTLE. *Highlights Agric. Res. (Ala. Stn.)* 16(2): 12.
441. HAYSLIP, N. C. 1945. INSECT PESTS AND THEIR CONTROL. ANNUAL REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1945. *Univ. Fla. Agric. Exp. Stn.*, p. 197.

442. HEARLE, E. 1938. INSECTS INJURIOUS TO LIVESTOCK AND POULTRY IN CANADA. Can. Dep. Agric. Publ. 604, pp. 18-19.

Recommended spreading out manure and permitting hogs to run with the cattle; hogs will scatter manure and prevent fly breeding.

443. HELM, R. W. 1951. HORN FLY CONTROL. Nebr. Agric. Coll. Ext. Circ. 1564, 2 pp.

444. HENRY, M., and W. B. GURNEY. 1932. THE BUFFALO FLY ("LYPEROSIA EXIGUA" DE MEIJERE). Agric. Gaz. N. S. W. 43(pt. 5) : 329-335.

445. HERMS, W. B. 1910. DESCRIPTION OF CATTLE FLIES IN CALIFORNIA. Calif. Cultivator 34: 131.

446. ——— 1913. SOME COMMON INSECTS AFFECTING THE ANIMAL INDUSTRY. Calif. Cultivator 41: 262.

447. ——— C. M. WHEELER, and H. P. HERMS 1934. ATTEMPTS TO TRANSMIT EQUINE ENCEPHALITIS BY MEANS OF BLOOD SUCKING INSECTS, ESPECIALLY MOSQUITOES. J. Econ. Entomol. 27(5) : 987-988.

Could not be successfully transmitted by horn fly.

448. HERRICK, G. W. 1899. SOME INSECTS INJURIOUS TO STOCK AND REMEDIES THEREFORE. Miss. Agric. Exp. Stn. Bull. 53.

449. ——— 1902. REPORT OF THE BOTANIST AND ENTOMOLOGIST. Miss. Agric. Exp. Stn. Rep. 1901: 26-28.

450. HIBLER, C. P. 1966. DEVELOPMENT OF "STEPHANOFILARIA STILESII" IN THE HORN FLY. J. Parasitol. 52(5) : 890-898.

Horn fly was found to be the intermediate host for *S. stilesii*, a filaroid nematode which causes a circumscribed dermatitis along the midventral line of a cow's body. Filaroid larvae were found in 455 of 3,707 female flies and 6 of 2,234 male flies collected.

451. HILL, G. F. 1912. ENTOMOLOGIST'S REPORT. Rep. Admin. North. Terr. Aust., p. 33.

452. ——— 1913. ENTOMOLOGIST'S REPORT. Rep. Admin. North. Terr. Aust., p. 27.
453. ——— 1915a. REPORT OF THE GOVERNMENT ENTOMOLOGIST. Rep. Admin. North. Terr. Aust., p. 44.
454. ——— 1915b. SOME NOTES ON THE BIONOMICS OF THE BUFFALO FLY ("LYPEROSIA EXIGUA," MEIJ.). Linn. Soc. N.S.W. Proc. 1(41): 763-768.
Buffalo fly came from East Indies about 1824. Ants were found predaceous on fly eggs.
455. ——— 1926. THE BUFFALO FLY IN NORTH AUSTRALIA. Pan-Pac. Sci. Congr. Aust. Proc. 1(1923): 409-411.
Buffalo fly believed to overwinter as adults; under lab conditions, the buffalo fly required 120 to 208 hrs for complete life cycle.
456. HILL, J. A. 1947. INSECT PESTS. Wyo. Agric. Exp. Stn. Annu. Rep. 57(1947): 35.
457. ——— 1949. INSECT PESTS. Wyo. Agric. Exp. Stn. Annu. Rep. 59(1949): 27.
458. ——— 1950. CURE FOR HORN FLIES. Wyo. Agric. Exp. Stn. Annu. Rep. 60(1950): 22-23.
459. HINDS, W. E. 1926. Department of Entomology. Agric. Exp. Stn. La. State Univ. Agric. Mech. Coll. Annu. Rep. 1925: 19-27.
460. HITCHCOCK, L. F., and I. M. MACKERRAS. 1947. THE USE OF DDT IN DIPS TO CONTROL CATTLE TICK. J. Coun. Sci. Ind. Res. Aust. 20(1): 43-55.
461. HIXON, E. 1946. EXTERNAL PARASITES OF CATTLE. Okla. A. & M. Coll. Ext. Serv. Circ. 387, pp. 20-21.
462. HO, C. 1936. ON THE BLOOD-SUCKING MUSCIDAE OF PEI-PING. Bull. Fan. Mem. Inst. Biol. 6(5): 185-206.
Describes species of *Haematobia* which were found in China.

463. HOELSCHER, C. E., J. R. BRAZZEL, and R. L. COMBS. 1967. OVERWINTERING OF THE HORN FLY IN NORTHEAST MISSISSIPPI. *J. Econ. Entomol.* 60(4) : 1175-1176.

Horn flies overwintered as diapausing pupae in dung and soil beneath the dung.

464. ——— and R. L. COMBS. 1971. THE HORN FLY. 1. SEASONAL INCIDENCE OF DIAPAUSE IN MISSISSIPPI. *J. Econ. Entomol.* 64(1) : 256-259.

Three-year study of overwintering horn flies indicated that October was the principal time for development of diapausing individuals. Mid-November was last period suitable for fall adult emergence.

465. ——— R. L. COMBS, and J. R. BRAZZEL. 1968. HORN FLY DISPERSAL. *J. Econ. Entomol.* 61(2) : 370-373.

Horn flies moved distances in excess of 400 yards; flies were active in seeking a suitable host although movement was principally nocturnal.

466. HOFFMAN, R. A. 1959. HORN FLY CONTROL STUDIES IN WESTERN MISSISSIPPI, 1958 AND 1959. (Abstract) *Assoc. South Agric. Workers Proc.* 56: 130.

467. ——— I. L. BERRY, and O. H. GRAHAM. 1965. CONTROL OF FLIES ON CATTLE BY FREQUENT LOW-VOLUME MIST SPRAY APPLICATIONS OF CIODRIN. *J. Econ. Entomol.* 58(5) : 815-817.

Good horn fly control was obtained by Ciodrin mist applied by cow actuated sprayers.

468. ——— R. O. DRUMMOND, and O. H. GRAHAM. 1969. SURVEY METHODS FOR LIVESTOCK INSECTS. *U.S. Dep. Agric., Agric. Res. Serv.* 81-83, pp. 87-90.

469. ——— and R. H. ROBERTS. 1963. HORN FLY CONTROL STUDIES IN MISSISSIPPI, 1961. *J. Econ. Entomol.* 56(3) : 258-261.

Five different studies on the application of insecticides to cattle for horn fly control were conducted. Animals having access to Ronnel/salt had fewer flies than cattle receiving plain salt. Automatic sprayer provided good

horn fly control using synergized pyrethrins. Wetttable powders proved more effective than sprays. Backrubbers gave better control than sprays.

470. ——— and C. D. SCHMIDT. 1968a. THE EFFECTS OF A FIELD RELEASE OF STERILE MALE HORN FLIES ON A SEMI-ISOLATED POPULATION. 6th Natl. Congr. Entomol. organized by the Mex. Soc. Entomol. Oct. 23-26, 1967. Folia Entomol. Mex. No. 18-19, 131 pp. Mexico, D.F.
Pupae were sterilized by exposure to 1,700 rads gamma radiation from ^{60}Co . Males were not fully competitive with untreated males. Releases of flies reduced horn fly population on an isolated herd of cattle.
471. ——— and C. D. SCHMIDT. 1968b. TUMBLER DRYER FOR FLY PUPAE ("HAEMATOBIA IRRITANS" L. AND "STOMOXYS CALCITRANS" L.) AFTER FLOTATION. U.S. Dep. Agric., Agric. Res. Serv. ARS 33-128, 4 pp.
472. HOPKINS, A. D. 1891. THE HORN FLY. Annu. Rep. W.Va. Agric. Exp. Stn. 3(1891): 159.
Records presence of horn fly in W. Virginia.
473. ——— 1893. INJURIOUS INSECTS, AND HOW TO DEAL WITH THEM IN MAY. W.Va. Farm. Bull. 1(2).
474. HORNSTEIN, I., W. S. MCGREGOR, and W. N. SULLIVAN. 1956. LOWERING THE VOLATILITY OF LINDANE CATTLE SPRAYS BY ADDITION OF FILM-FORMING MATERIAL. J. Agric. Food Chem. 4(2): 148-149.
Effectiveness of lindane on horn flies was increased.
475. HOWARD, L. O. 1894. THE HORN FLY ATTACKING HORSES. Insect Life, vol. 7, p. 54.
476. ——— 1895a. THE HORN-FLY IN TEXAS. Insect Life, vol. 7, p. 429.
477. ——— 1895b. THE HORN FLY IN NEW JERSEY. Insect Life, vol. 7, p. 429.
478. ——— 1895c. A HORN-FLY TRAP. Insect Life, vol. 7, p. 425.

479. ——— 1897. NOTES FROM CORRESPONDENCE. U.S. Dep. Agric., Div. Entomol. Bull. No. 7, pp. 84-87.
480. ——— 1899. DIPTERA COLLECTED IN HAWAII BY H. W. HENSHAW. Entomol. Soc. Wash. Proc. 4: 490.
List of insects from the islands included *Haematobia serrata*.
481. ——— 1901. DIPTERA BRED FROM COW-MANURE. Can. Entomol. 33: 42-44.
List of manure infesting diptera that Howard observed while compiling his report on the horn fly (1889).
482. ——— 1911. HOUSE FLIES. U.S. Dep. Agric. Farmers' Bull. 459, p. 11.
Described use of slaked lime on manure to stop horn fly breeding.
483. ——— 1926. REPORT OF THE ENTOMOLOGIST (1925-26). U.S. Dep. Agric., 30 pp.
484. HOWELL, D. E. 1952. FLY CONTROL IN OKLAHOMA. Okla. Agric. Exp. Stn. Bull. No. B-385, 18 pp.
Sprayed cattle gained 15 to 30 lbs more than did unsprayed cattle.
485. ——— 1953. HORN FLY CONTROL. West. Live Stock 38(10): 21.
486. ——— 1959. SYMPOSIUM ON FLY CONTROL. FLY CONTROL IN OKLAHOMA. Chem. Spec. Assoc. Midyr. Meeting 45: 124-125.
487. ——— and F. A. FENTON. 1944. THE REPELLENCY OF A PYRETHRUM-THIOCYANATE OIL SPRAY TO FLIES ATTACKING CATTLE. J. Econ. Entomol. 37(5): 677-680.
Oil base spray with 6 percent toxicants was repellent to the horn fly for 10.5 hrs. Horn fly infestation was greater in the morning.
488. ——— and L. D. GOODHUE. 1955. FLY REPELLENTS. Soap Chem. Spec. 31(10): 181, 185, 187, 189, 221.

489. HOYT, A. S. 1952. REPORT OF THE CHIEF OF THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, 1952. U.S. Dep. Agric., p. 61.
490. HUCKETT, H. C. 1965. THE MUSCIDAE OF NORTHERN CANADA, ALASKA, AND GREENLAND (DIPTERA). Mem. Entomol. Soc. Can. No. 42, pp. 328-329.
491. HUNTER, W. N. 1896. THE DIPTEROUS ENEMIES OF DOMESTIC ANIMALS AND MAN. Nebr. State Bd. Agric. Annu. Rep. 1895: 288-306.
492. HURWOOD, I. S. 1968. METHOXYCHLOR RESIDUES IN THE MEAT AND MILK OF CATTLE FOLLOWING LIMITED APPLICATIONS OF METHOXYCHLOR FOR THE CONTROL OF BUFFALO FLY. Aust. Vet. J. 44(8): 377-381.
493. HUTCHINS, R. E. 1957. INSECT CONTROL MEASURE TESTED. ENTOMOLOGY DEPARTMENT ANNUAL REPORT. Miss. Farm Res. 20(7): 8.
Control of horn flies did not influence milk flow.
494. IVASHKIN, V. M. 1958. OBSERVATIONS ON THE ECOLOGY OF THE BLOOD SUCKING FLY "LYPEROSIA TITILLANS" BEZZI AND ITS IMPORTANCE IN THE BIOLOGY OF THE ANIMAL NEMATODE "PARABRANEMA SKRHABINI." (In Russian.) Report of Expedition of the Helminthological Laboratory of the U.S.S.R. Academy of Sciences (1945-47), pp. 109-118.
495. IVEY, M. C., and J. L. ESCHLE. 1970. RESIDUES OF DICHLORVOS IN MILK AND TISSUES OF DAIRY COWS TREATED TO CONTROL INSECT PESTS. J. Econ. Entomol. 63(6): 1729-1730.
No residues were detected when 2 oz of a 1 percent solution of dichlorvos was applied daily for horn fly control.
496. JACK, R. W. 1917. NATURAL TRANSMISSION OF TRYPANOSOMIASIS ("T. PECCRUM" GROUP) IN THE ABSENCE OF TSETSE-FLY. Bull. Entomol. Res. 8(1): 35-41.
Lyperosia may be vector of trypanosomes.

497. ——— 1935. ANNUAL REPORT FOR THE YEAR 1933: ENTOMOLOGICAL BRANCH. Salisbury Agric. Lab. Fol., 18 pp. (Mimeographed.)
498. ——— 1936. ANNUAL REPORT OF THE DIVISION OF ENTOMOLOGY FOR THE YEAR ENDED 31 DECEMBER, 1935. Rhod. Agric. J. 33(5): 329-356.
Screwworms infested sores of cattle caused by the cattle rubbing places where they had been attacked by buffalo fly.
499. JANES, M. J., B. W. HAYES, and D. W. BEARDSLEY. 1968. HORN FLY CONTROL WITH COUMAPHOS. J. Econ. Entomol. 61(5): 1176-1178.
Horn fly was controlled by using 1 and 5 percent coumaphos in dust bags.
500. ——— B. W. HAYES, and D. W. BEARDSLEY. 1970. HORN FLIES AND CATTLE GRUBS ON BEEF CATTLE IN EVERGLADES AND RESULTS OF INSECTICIDE TESTING. Fla. Everglades Exp. Stn. Mimeo. Rep. Ees 70-4, 4 pp.
Dust bags containing Co-Ral or Prolate effectively controlled horn fly.
501. JENKINS, C. F. H. 1945. ENTOMOLOGICAL PROBLEMS OF THE ORD RIVER IRRIGATION AREA. J. Dep. Agric. West. Aust. (2) 22(2): 131-145.
Buffalo fly important pest of cattle, horses, mules, and donkeys; found to thrive in the coastal areas during the wet season.
502. ——— 1946. BIOLOGICAL CONTROL IN WESTERN AUSTRALIA. PRESIDENTIAL ADDRESS, 1946. J. R. Soc. West. Aust. 32: 1-17.
Short history of the biocontrol of buffalo fly in Australia. Most promising parasite was *Spalangia sindaica*; releases were made many times, but results were negative.
503. JENSEN, H. 1909. FLY REPELLENTS. Mo. Valley Vet. Bull. 4(5): 30-31.
504. JOHNSON, W. H., and E. C. LOOMIS. 1967. HORN FLY AND GRUB CONTROL ON BEEF CATTLE. Calif. Agric. 21(10): 12-14.

505. JOHNSON, W. T., and G. S. LANGFORD. 1960. RESIDUAL EFFECTIVENESS OF CERTAIN INSECTICIDES IN HORN FLY CONTROL. *J. Econ. Entomol.* 53(3) : 477-478.

Various insecticides tested for residual toxicity; sprays were generally not as effective as dusts.

506. JOHNSTON, T. H. 1920. FLIES AS TRANSMITTERS OF CERTAIN WORM PARASITES OF HORSES. *Sci. Ind. (Melbourne)* 2(6) : 369-372.

Buffalo fly may serve as a possible host for *Habronema microstoma*.

507. ——— and M. J. BANCROFT. 1920. THE LIFE HISTORY OF "HABRONEMA" IN RELATION TO "MUSCA DOMESTICA" AND NATIVE FLIES IN QUEENSLAND. *R. Soc. Queensl. Proc.* 32(5) : 61-88.

Buffalo fly may serve as a possible host for *Habronema*.

508. ——— and O. W. TIEGS. 1922. NOTES ON THE BIOLOGY OF SOME OF THE MORE COMMON QUEENSLAND MUSCOID FLIES. *R. Soc. Queensl. Proc.* 34(3) : 77-104.

509. JONES, C. K., H. T. BARRON, and C. L. BOYD. 1968. OCCURRENCE OF "STEPHANOFILARIA STILESII" IN TEXAS. *Southwest. Vet.* 21(2) : 139-140.

Parasite is transmitted by the horn fly.

510. JUDD, C. S. 1921. BIRD INTRODUCTIONS. *Hawaii. Forest. Agric.* 18(11) : 238-239.

Introduction of birds to control horn fly discussed; Chinese flycatcher became established on the islands. Common meadowlark may occasionally feed on horn flies.

511. KANO, R. 1953. NOTES OF THE FLIES OF MEDICAL IMPORTANCE IN JAPAN. VII. EGGS AND LARVAE OF STOMOXYDINAE IN JAPAN. *Jap. J. Exp. Med.* 23(2) : 187-195.

512. KANTACK, B. H., W. L. BERNDT, and E. U. BALSBAUGH. 1967. HORN FLY AND FACE FLY CONTROL ON RANGE CATTLE WITH AERIAL APPLICATIONS OF ULV MALATHION SPRAYS. *J. Econ. Entomol.* 60(6) : 1766-1767.

Excellent fly control obtained using aerial sprays; 4 to 6 applications needed for seasonal fly control.

513. KELLICOTT, D. S. 1891. NOTE ON THE HORN FLY IN OHIO. *Insect Life* 4: 35-36. Also in *Entomol. Soc. Ont. Annu. Rep.* 22(1891): 59.
514. ——— 1891. REPORT OF COMMITTEE ON ENTOMOLOGY. *J. Columbus Hort. Soc.*, p. 100.
515. KELLY, E. G. 1946. HORN FLY CONTROL IN KANSAS. *Am. Assoc. Econ. Entomol. North Cent. States Br. Proc.* 25: 53.
516. ——— 1947. THE FLIES THAT REST ON THE HORN AFTER FEEDING—THE HORN FLY AND DDT. *Sheep Goat Raiser* 27(9): 10.
517. KELSER, R. A. 1927. TRANSMISSION OF SURRA AMONG ANIMALS OF THE EQUINE SPECIES. *Philipp. J. Sci.* 34(2): 115-141.
Surra was not transmitted by buffalo fly under lab conditions.
518. KENNEDY, T. L. 1948. DEPARTMENT OF ENTOMOLOGY AND ZOOLOGY, HORN FLY STUDIES. *Ont. Dep. Agric., Rep. Min. Agric. for the Year Ending March 31, 1948*, p. 25.
519. KENT, F. L. 1903. DEPARTMENT DAIRYING. *Oreg. Agric. Coll. Exp. Stn. Annu. Rep.* 15(1903): 29-33.
520. KESSLER, H. K., and W. L. BERNDT. 1971. COMPARISON OF DUST BAGS TO BACKRUBBERS FOR CONTROL OF HORN FLIES AND FACE FLIES ON BEEF CATTLE IN EAST-CENTRAL SOUTH DAKOTA. *J. Econ. Entomol.* 64(6): 1465-1466.
Both devices provided excellent horn fly control on adult cattle and calves.
521. KHAN, M. A. 1964. RECENT DEVELOPMENTS IN THE CONTROL OF ARTHROPOD PARASITES OF CATTLE. *Can. Vet. J.* 5(2): 20-29.
522. ——— and J. E. LAWSON. 1965. SUMMER TREATMENTS FOR CATTLE GRUB CONTROL AND THEIR EFFECTS ON HORN FLIES AND CATTLE WEIGHT GAINS. *Can. J. Anim. Sci.* 45(1): 43-50.

No significant weight gains were obtained by controlling horn flies.

523. KING, C. A. 1949. EXTERNAL PARASITES OF LIVESTOCK AND THEIR CONTROL. Tex. A & M Coll. Ext. Serv. Bull. 158, pp. 6-7.

524. KINZER, H. G. 1966. CONTROLLING HORN FLIES ON RANGE CATTLE. Anim. Nutr. Health. 21(12) : 9-10.

Horn flies were controlled by low volume malathion spray.

525. ——— 1967. CONTROLLING HORN FLIES ON RANGE CATTLE. Agrichem. West. 10(3) : 21-22.

526. ——— 1969a. AERIAL APPLICATIONS OF ULV INSECTICIDES TO CONTROL THE HORN FLY ON UNRESTRAINED CATTLE. J. Econ. Entomol. 62(6) : 1515-1516.

Control was erratic from one application to another; treatments only provided short-term control.

527. ——— 1969b. DUST BAG AND BACKRUBBER APPLICATION OF INSECTICIDES FOR CONTROL OF THE HORN FLY ("HAEMATOBIA IRRITANS"). N. Mex. Agric. Exp. Stn. Res. Rep. 159, 8 pp.

Dust bags and cable backrubbers proved effective and practical for horn fly control in field tests. Could be more effective than spray programs in the Southwest.

528. ——— 1970. GROUND APPLICATION OF ULV MALATHION AND FENTHION FOR HORN FLY CONTROL IN NEW MEXICO. J. Econ. Entomol. 63(3) : 736-739.

ULV formulations were applied at 7-day intervals to range cattle by a ULV applicator in a pickup truck. Horn flies were reduced 59-94 percent using this spray method.

529. ——— and R. G. BULLARD. 1967. ANIMAL SYSTEMIC INSECTICIDES FOR CONTROL OF THE HORN FLY. N.Mex. Agric. Exp. Stn. Res. Rep. 129, 4 pp.

Several systemic insecticides were compared for control of the horn flies on 25 herds of cattle. Pour-ons of Co-Ral and Rulene provided best fly control; mineral block consumption varied within the herds.

530. ——— I. W. BURNS, and J. L. AUCLAIR. 1970. AN OLFACTOMETER FOR MEASURING HOST ATTRACTION IN THE HORN FLY. *J. Econ. Entomol.* 63(4) : 1335-1337.

Presented design of an olfactometer. Early tests indicated horn flies responded positively to human odor; newly emerged flies did not show this response. Device could also be used to test effects of repellents on horn fly.

531. KNAPP, F. W. 1962. HORN FLY AND FACE FLY CONTROL STUDIES WITH DOW M-1816. *J. Econ. Entomol.* 55(5) : 816-817.

Horn flies could be controlled with M-1816; the insecticide need not be applied daily and it was found not necessary to treat every animal in the herd.

532. ——— 1965a. THE EFFECT OF FREE-CHOICE COUMAPHOS SALT MIXTURES ON CATTLE AND CATTLE PARASITES. *J. Econ. Entomol.* 58(2) : 197-199.

Horn fly control was erratic.

533. ——— 1965b. FREE CHOICE FEEDING OF RONNEL MINERAL BLOCK AND GRANULES FOR FACE FLY, HORN FLY, AND CATTLE GRUB CONTROL. *J. Econ. Entomol.* 58(5) : 836-838.

Good horn fly control was obtained with both forms of Ronnel. Cows and calves preferred the mineral block over the granules; heifers consumed more Ronnel mineral block than either cows or calves.

534. ——— 1966. AERIAL APPLICATION OF TRICHLORFON FOR HORN FLY AND FACE FLY CONTROL ON CATTLE. *J. Econ. Entomol.* 59(2) : 468.

Reduction (92-96 percent) in numbers of horn flies was realized by aerial spraying; Trichlorfon was applied at the rate of 0.1 lbs/acre.

535. ——— 1967. ULTRA-LOW-VOLUME AERIAL APPLICATION OF TRICHLORFON FOR CONTROL OF ADULT MOSQUITOS, FACE FLIES, AND HORN FLIES. *J. Econ. Entomol.* 60(4) : 1193.

Horn flies were controlled up to two weeks by spray.

536. ——— N. W. BRADLEY, and W. C. TEMPLETON. 1967. EFFECT OF RONNEL MINERAL BLOCK (RID-EZY) ON CONTROL OF CATTLE GRUBS AND WEIGHT GAIN OF BEEF CATTLE. *J.*

Econ. Entomol. 60(5) : 1455-1456.

Horn flies were controlled as a result of grub treatment.

537. KNAPP, S. E., G. M. PADILLA, and F. M. PHILIPS. 1955. AN APPARENT HUMAN CASE OF MYIASIS BY THE HORN FLY, "SIPHONA IRRITANS." *Parasitology* 41: 324.

538. KNIBBS, G. H. 1924. INVESTIGATIONS OF STOCK DISEASES. *Inst. Sci. and Industr. Aust. 2nd Annu. Rep. 1922-23*, pp. 17-27.

539. KNIPLING, E. F. 1938. INTERNAL TREATMENT OF ANIMALS WITH PHENOTHIAZINE TO PREVENT DEVELOPMENT OF THE HORN FLY IN MANURE. *J. Econ. Entomol.* 31(2) : 315-316.

Phenothiazine administered to cattle at rate of 0.1 g/kg of body weight prevented horn fly development in the manure; the manure was not affected until 7 hrs after ingestion of phenothiazine.

540. ——— 1950a. FLY CONTROL FOR 1950. *Hoard's Dairyman* 95(8) : 307, 314.

541. ——— 1950b. INSECTICIDES FOR LIVESTOCK PEST CONTROL. LINDANE AND TOXAPHENE ARE RECOMMENDED AS SPRAYS ON LIVESTOCK OTHER THAN DAIRY ANIMALS—REPEATED APPLICATIONS FOUND NON-TOXIC. *Soap Sanit. Chem.* 26(6) : 130-131, 133, 135, 155, 157.

542. ——— and W. C. McDUFFIE. 1956. FLIES THAT AFFECT LIVESTOCK. *U.S. Dep. Agric. Yearb.* 1956: 166-172.

543. KNOWLES, C. O., and B. W. ARTHUR. 1966. RESIDUES ASSOCIATED WITH BACKRUBBER APPLICATION OF RONNEL TO DAIRY COWS. *J. Econ. Entomol.* 59(3) : 752-753.

No detectable residues were found in the milk.

544. KNOWLTON, G. F. 1966. INSECT CONTROL ON DAIRY CATTLE. *Utah State Univ. Ext. Entomol. Mimeo.* 88, 2 pp.

545. ——— 1967. LIVESTOCK INSECT CONTROL. *Utah State Univ. Ext. Entomol. Mimeo. Ser.* 120, 2 pp.

546. ——— and B. A. HAWS. 1958. HORN FLIES; CONTROL THEM ON CATTLE. Utah State Univ. Agric. Ext. Leaf. 35, 4 pp.
547. ——— and A. W. LINDQUIST. 1953. CONTROL OF HORN FLIES ON CATTLE. Utah State Agric. Coll. Ext. Circ. 201, 2 pp.
548. ——— and A. W. LINDQUIST. 1955. CONTROLLING HORN FLIES ON CATTLE. Utah State Agric. Coll. Ext. Serv. Circ. 222, 2 pp.
549. ——— and D. W. THOMAS. 1963. CONTROL HORN FLIES ON CATTLE. Utah State Univ. Agric. Ext. Leaf. 35, 6 pp. (rev.)
550. ——— and D. W. THOMAS. 1965. HORN FLY CONTROL ON CATTLE. Utah State Univ. Ext. Leaf. EL 35, 6 pp. (rev.)
551. KOEBELE, A. 1899. REPORT OF THE MINISTER OF THE INTERIOR TO THE PRESIDENT OF THE REPUBLIC OF HAWAII FOR THE YEAR ENDING DEC. 31, 1898. Report Entomologist for 1898, pp. 78-89.
First record of horn fly in islands.
552. KOLACH, A. J. 1967. DUST BAGS FOR HORN FLY CONTROL ON BEEF CATTLE. Manit. Entomol. 1: 34-35.
553. KRIJGSMAN, B. J., and G. L. WINDRED. 1930a. DE GAS-THEERKEUZE VAN BLOEDZUIGENDE ARTHROPODEN. DEEL II. "LYPEROSIA EXIGUA." Ned.-Ind. Bl. Diergeneesk. 42(2): 110-120.
Field and lab experiments on the trophisms of the buffalo fly discussed. Skin odor of the host was chief stimulus that induced feeding and allowed fly to differentiate between animal species.
554. ——— and G. L. WINDRED. 1930b. REIZPHYSIOLOGISCHE UNTERSUCHUNGEN ON BLUT SAUGENDEN ARTHROPODEN IM ZUSAMMENHANG MIT IHRER NAHRUNGSWAHL. Z. Vgl. Physiol. 13(1): 61-73.
Discussed habits of buffalo fly; temperature and humidity preferences explained well.

555. ——— and G. L. WINDRED. 1931. PHYSIOLOGISCH-OLCOLOGISCHE ONDERZOEKINGEN OVER "LYPEROSIA EXIGUA." DEEL I. DE RELATIE TUSSCHEN DE VOLWASSEN "LYPEROSIA" EN ZOOGDIERFAECES. (With English and German summaries.) Ned.-Ind. Bl. Diergeneesk. 43(2): 113-121.

Flies attracted by smell; fed on dung of cattle, buffalo, and horses. Attraction of dung decreased with age.

556. ——— and G. L. WINDRED. 1933. INVESTIGATIONS ON THE BUFFALO FLY, "LYPEROSIA EXIGUA" DE MEIJ. I. THE HOST PREFERENCE OF "L. EXIGUA." II. THE RELATION BETWEEN THE ADULT "L. EXIGUA" AND MAMMALIAN FECES. III. SOME FOOD REACTIONS OF THE LARVAE OF "L. EXIGUA." IV. THE INFLUENCE OF MOISTURE ON THE LARVAE OF "L. EXIGUA." Coun. Sci. Ind. Res. Aust. Pamp. No. 43, 40 pp.

Tested reaction of buffalo fly to various stimuli; could distinguish between different kinds of dung. Dung smell provided basic stimulus for egg-laying. Larvae preferred fresh buffalo dung, but could survive in most any type. Close correlation was found between rainfall and populations of buffalo fly.

557. KRISHNA IYER, P. R., and S. M. SARWAR. 1935. BOVINE SURRA IN INDIA, WITH A DESCRIPTION OF A RECENT OUTBREAK. Indian J. Vet. Sci. 5(2): 158-170.

Trypanosomes were found in *Haematobia* which had fed on infected cattle.

558. KUNZ, S. E., R. R. BLUME, B. F. HOGAN, and J. J. MATTER. 1970. BIOLOGICAL AND ECOLOGICAL INVESTIGATIONS OF HORN FLIES IN CENTRAL TEXAS: INFLUENCE OF TIME OF MANURE DEPOSITION ON OVIPOSITION. J. Econ. Entomol. 63(3): 920-923.

Fresh manure was covered with emergence traps at 2-hr intervals during the day and night once a week from May to October. Overall emergence was 66.5 flies/pat throughout the test period. Horn flies were found to oviposit day and night.

559. KUWAYAMA, S. 1953. ON THE SEASONAL PREVALENCE OF THE HORN FLY, "LYPEROSIA" (I.E. "SIPHONA") "IRRITANS" IN HOKKAIDO. (In Japanese.) Hokkaido Natl. Agric. Exp. Stn. 64: 125-129.

560. ——— and S. KATO. 1939. ON "LYPEROSIA IRRITANS" (L.), SO-CALLED HORN FLY IN JAPAN. (In Japanese.) Oyo Koutyu. 1(4): 151-159. Abstr. Rev. Appl. Entomol. 27: 155. 1939.

Horn fly was widespread in Hokkaido where it was first observed in 1937. Morphology of adult fly was discussed.

561. KUZINA, O. S. 1942. ON THE GONOTROPHIC RELATIONSHIPS IN "STOMOXYS CALCITRANS" (L.) AND "HAEMATOBIA STIMULANS" (L.). (In Russian.) Med. Parazit. 11(3): 70-78. Abstr. in Rev. Appl. Entomol. (B) 32: 51-52. 1944.

Process of blood digestion and egg maturation was studied mainly on *S. calcitrans*, but observations also were recorded for *H. stimulans*. Feeding on free fluids was more common in the habits of *H. stimulans* than *S. calcitrans*. Peritrophic membrane formation and the maturation of eggs was similar in the two fly species.

562. ——— 1950. COMPARATIVE PARASITOLOGICAL AND ECOLOGICAL OBSERVATIONS ON BLOOD SUCKING FLIES, "STOMOXYS CALCITRANS" (L.), "HAEMATOBIA STIMULANS" (MEIG.), AND "LYPEROSIA IRRITANS" (L.). (In Russian.) Mater. Poznaniyu Fauny Flory SSSR. Otd. Zool. 30(15): 139-165.

563. KYD, S. 1950. CONTROLLING HORN FLIES AND TICKS. Okla. Agric. Coll. Ext. Circ. 525, 4 pp.

564. LAAKE, E. W. 1944. FLY CONTROL. Hoard's Dairyman 89: 323.

565. ——— 1945. INSECT PEST SURVEY, SUMMARY OF INSECT CONDITIONS IN 1944. U.S. Dep. Agric. Entomol. Plant Quar., p. 17.

566. ——— 1946a. Rep. Kans. State Bd. Agric. 65(272): 90-92.

567. ——— 1946b. DDT FOR THE CONTROL OF THE HORN FLY IN KANSAS. J. Econ. Entomol. 39(1): 65-68.

568. ——— 1949a. CHLORINATED HYDROCARBON INSECTICIDES FOR THE CONTROL OF THE HORN FLY ON BEEF CATTLE IN KANSAS AND MISSOURI. *J. Econ. Entomol.* 42(1): 143-144.
569. ——— 1949b. INSECTS AFFECTING ANIMALS. *Am. Assoc. Econ. Entomol. North Cent. States Br. Proc.* 4: 76-78.
570. ——— 1950. CONTROL OF HORN FLIES ON CATTLE. *Am. Assoc. Econ. Entomol. North Cent. States Br. Proc.* 5: 15.
571. ——— D. W. HOWEEL, P. A. DAHM, P. C. STONE, and R. L. CUFF. 1950. RELATIVE EFFECTIVENESS OF VARIOUS INSECTICIDES FOR CONTROL OF HOUSE FLIES IN DAIRY BARNS AND HORN FLIES ON CATTLE. *J. Econ. Entomol.* 43(6): 858-861.
Horn flies were easily controlled with the insecticides tested.
572. LACHANCE, L. E. 1964. CHROMOSOME STUDIES IN THREE SPECIES OF DIPTERA (MUSCIDAE AND HYPODERMATIDAE). *Ann. Entomol. Soc. Am.* 57(1): 69-73.
Horn fly and stable fly have a diploid number of 10 chromosomes.
573. LANCASTER, J. L. 1962a. LIVESTOCK PARASITE CONTROL WITH BROAD SPECTRUM SYSTEMICS. *Ark. Farm Res.* 11(3): 7.
574. ——— 1962b. HORN FLIES, GRUBS CONTROLLED EFFECTIVELY IN SYSTEMIC TRIALS. *Feed Bag* 38(8): 36-37.
575. ——— and J. S. SIMCO. 1967. METHODS FOR CONTROLLING HORN FLIES ON CATTLE. *Ark. Farm Res.* 16(4): 10.
576. ——— J. S. SIMCO, and R. WATSON. 1961. CATTLE GRUB CONTROL WITH TWO SYSTEMIC INSECTICIDES. *Ark. Farm Res.* 10(6): 10.
577. LARSON, E. B. 1943a. THE INFLUENCE OF HUMIDITY ON LIFE AND DEVELOPMENT OF INSECTS. *Vidensk. Medd. Dan. Naturhist. Foren. Kbh.* 107: 127-184.

Horn fly eggs were sensitive to changes in humidity; no eggs hatched below 95 percent RH. No larval mortality occurred in third instar larvae at 96–100 percent RH. Pupae required high humidity to live; below 75 percent RH all pupae died. Immature stages of horn fly preferred 100 percent humidity.

578. ——— 1943b. PROBLEMS OF HEAT DEATH AND HEAT INJURY. Vidensk. Selsk. Biol. Medd. 19: 1–52.

Haematobia stimulans and *Lyperosia irritans* were exposed to fatally high temperatures; it was observed that if the temperature rises in arithmetical progression the effect increases geometrically. Death from heat did not always occur immediately after exposure, but sometimes in later development of the insect. Higher mortality resulted if heat was applied during periods of intensive activity (puparium formation).

579. ——— and M. THOMSEN. 1940. THE INFLUENCE OF TEMPERATURE ON THE DEVELOPMENT OF SOME SPECIES OF DIPTERA. Vidensk. Medd. Dan. Naturhist. Foren. Kbh. 104: 1–75.

Shortest development of horn fly was 7.5 days at 32.3° C; longest was 75 days at 13°. A sudden drop in temperature retarded development of the pupa; diapause may be induced by a sudden drop in temperature. *Haematobia stimulans*, a species adapted to colder climates, can complete development at temperatures ranging from 10.7 to 30.1°.

580. LATREILLE, P. A., A. L. M. LEPELETIER, J. G. A. SERVILE, and F. E. GUERIN-MENEVILLE. 1825–28. ENTOMOLOGIE, OU HISTOIRE NATURELLE CRUSTACES, DES ARACHIDES ET DES INSECTS. (pt. 2 (= insectes i.e., arthropoda pt. 7)). Vol. 10, pp. 1–344 (=livr. 96), 1825; pp. 345–833 (=livr. 100), 1828. In Societe de Gens de Lethes, de Savans et d'Artistes, Encyclopedie Methodique (q.v.), Histoire Naturelle, Paris.

Description of genus *Haematobia*.

581. LAURANCE, B. R. 1954. THE LARVAL INHABITANTS OF COW PATS. J. Anim. Ecol. 23: 234–260.

Interrelationships of predators, parasites, and copro-

phagous larvae were discussed. Dung community has marked differences in seasonal occurrence of different species of insects; each dung pat has a varying number of inhabitants because no two pats found to lie in exactly the same surroundings.

582. LEE, A. 1938. Annual Report, 1937, P.R. Agric. Exp. Stn. (Mayaguez), pp. 100-101.

Horn fly parasites were introduced from Hawaii; native parasite was reared from horn fly.

583. ——— 1941. Annual Report, 1940, P.R. Agric. Exp. Stn. (Mayaguez), pp. 70-71.

584. LEESE, A. S. 1914. FINAL REPORT FOR 12 MONTHS ENDING 31ST MARCH, 1914. BRITISH EAST AFRICA; COMMUNICATED BY THE COLONIAL OFFICE.

Lyperosia may contribute to spread of trypanosomiasis. Flies occurred near dessert as well as near rivers; larger fly populations were noticed after rainy season.

585. LEGER, M. 1922. FORMES CRITHIDIENNES OBSERVEES CHEZ "LYPEROSIA THIROUXI" ROUBAUD. Contrib. R. Soc. Biol. 87(22): 134-136.

Crithidal flagellates were found in one *Lyperosia* specimen.

586. ——— and L. TEPPAZ. 1922. LE "HORSE-SICKNESS" AU SENEGAL ET AU SOUDAN FRANCAIS: DOCUMENTS HISTORIQUES, CLINIQUES ET EPIZOOTIQUES. Bull. Com. Etudes Hist. Sci. Afr. Occ. Francaise 1922 No. 2: 219-240.

Trypanosomes and crithidia were found in the stomach of *Lyperosia* sp.

587. LEGG, J. 1944. REPORT OF THE DIRECTOR OF VETERINARY SERVICES. Rep. Dep. Agric. Queensl. 1943-44: 18-21.

588. ——— 1945a. BUFFALO FLY. FLY MOVEMENTS AND MEASURES OF CONTROL. Aust. Vet. J. 21: 60-64.

Spread of buffalo fly in Australia discussed.

589. ——— 1945b. REPORT OF THE DIVISION OF ANIMAL INDUSTRY. Rep. Dep. Agric. Queensl. 1944-45: 17-23.

590. ——— 1946. REPORT OF THE ACTING DIRECTOR, DIVISION OF ANIMAL INDUSTRY. Rep. Dep. Agric. Queensl. 1945-46: 31-43.

591. ——— 1947. RECENT DEVELOPMENTS IN TICK AND BUFFALO FLY CONTROL. Aust. Vet. J. 23: 181-185.

Introduction of DDT for fly control was discussed.

592. LEGNER, E. F., and G. S. OLTON. 1971. DISTRIBUTION AND RELATIVE ABUNDANCE OF DIPTEROUS PUPAE AND THEIR PARASITOIDS IN ACCUMULATIONS OF DOMESTIC ANIMAL MANURE IN THE SOUTHWESTERN UNITED STATES. Hilgardia 40(14): 505-535.

No direct mention of horn fly, but discussed parasites associated with horn fly and related genera. Parasitoid complexes described and graphically illustrated for the major climatic zones in United States.

593. LEVER, R. A. 1933. ENTOMOLOGIST'S ANNUAL REPORT FOR THE YEAR 1931-32. Brit. Solomon Isl. Prot. Agric. Gaz. 1(1): 3-6

Buffalo fly caused considerable annoyance to cattle on Guadalcanal and the Russell Islands.

594. ——— 1934a. ENTOMOLOGY AND AGRICULTURE IN THE BRITISH SOLOMON ISLANDS. Trop. Agric. 11(2): 36-37.

Buffalo fly was primary pest of cattle in Solomons; probably introduced about 1923. Zebu cattle appeared to be more resistant to fly attack.

595. ——— 1934b. ANNUAL REPORT OF THE GOVERNMENT ENTOMOLOGIST FOR THE YEAR 1932-33. Brit. Solomon Isl. Prot. Agric. Gaz. 2(4): 2-5.

Importance of buffalo fly has been over estimated.

596. ——— 1936. REPORT OF THE ENTOMOLOGIST FOR YEAR 1935-36. Brit. Solomon Isl. Prot. Agric. Comm. (Tulagi), 4 pp.

Spalangia sundiaca (2,000) released with the hopes of controlling the buffalo fly.

597. ——— 1945. ANNUAL REPORT OF THE ENTOMOLOGIST FOR 1944. Agric. J. Fiji 16(3): 87-88.

598. LEVY, R., and H. L. CROMROY. 1970. INDICATOR CELLS FOR PREDICTION OF RADIATION INDUCED STERILITY IN BLOOD FEEDING DIPTERANS. *J. Parasitol.* 56(4, sec. II, pt. 1): 209.
599. LEWIS, L. F., and G. W. EDDY. 1961. LABORATORY EVALUATION OF INSECTICIDES AGAINST THE ADULT HORN FLY. *J. Econ. Entomol.* 54(2): 392-393.
Data presented on the comparative susceptibility of horn flies, stable flies, and horse flies to a variety of insecticides.
600. ——— and G. W. EDDY. 1964. SOME EFFECTS OF GAMMA RADIATION ON THE HORN FLY. *J. Econ. Entomol.* 57(2): 275-277.
Both sexes of the horn fly were sterilized by irradiation of pupae by gamma rays from a ^{60}Co source. Longevity was apparently unaffected by the radiation. Methods presented for obtaining horn fly eggs, mass rearing in the laboratory, and the sexing of newly emerged adults.
601. LINCOLN, C. 1945. TENTATIVE RECOMMENDATION FOR USE OF DDT. Univ. Ark. Coll. Agric. Ext. Serv. Misc. Publ. No. 14.
602. ——— and F. E. WHITEHEAD. 1950. PROTECT YOUR CATTLE FROM HORN FLIES, LICE, TICKS, GRUBS. Univ. Ark. Coll. Agric. Ext. Leaf. No. 137, pp. 2-3.
603. LINDQUIST, A. W. 1935. NOTES OF THE HABITS OF CERTAIN COPROPHAGOUS BEETLES AND METHODS OF REARING THEM. U.S. Dep. Agric. Circ. No. 351, 9 pp.
Dung beetles reduced the abundance of horn flies in the dung.
604. ——— 1936. PARASITES OF THE HORN FLY AND OTHER FLIES BREEDING IN DUNG. *J. Econ. Entomol.* 29(6): 1154-1158.
Spalangia muscidarum and *S. drosophilae* found to parasitize horn flies; 95 percent of the parasites recovered from horn fly pupae were *S. muscidarum*. Total parasitism of the horn fly by both species was 15 percent.

605. ——— 1956. INSECTS AS LIVESTOCK PESTS. Soap Chem. Spec. 32(4) : 146-148, 165.
606. ——— and R. A. HOFFMAN. 1954. EFFECTIVENESS OF CATTLE-RUBBING DEVICES AND HAND DUSTING FOR HORN FLY CONTROL. J. Econ. Entomol. 47(1) : 79-81.
Backrubbers gave better control than hand dusting and were also more practical.
607. ——— A. R. ROTH, R. A. HOFFMAN, and others. 1953. CHEMOTHERAPEUTIC USE OF INSECTICIDES FOR CONTROL OF BLOOD SUCKING INSECTS. J. Econ. Entomol. 46(4) : 610-614.
Lindane, when fed to cattle, eradicated the horn fly within 1 week on a research herd.
608. LINNAEUS, C. 1758. SYSTEMA NATURAE PER REGNA TRIA NATURAE. Ed. 10, v. 1, p. 604.
Type species and original description of horn fly (*Conops irritans*).
609. ——— 1761. FAUNA SVECICA SISTENS ANIMALIA SVECIAE REGNI. Ed. 2, p. 467.
Description of *Conops irritans*.
610. LINTNER, J. A. 1888a. A FLY ON THE HEADS OF CATTLE. Country Gentleman, Sept. 20, p. 705.
611. ——— 1888b. THE COW-FLY, HORN-FLY OR TEXAS-FLY. Country Gentleman, Oct. 11, p. 759.
612. ——— 1888c. THE COW-FLY OR TEXAS-FLY. Country Gentleman, Oct. 18, p. 779.
613. ——— 1888d. IDENTIFICATION OF THE COW-FLY—"HAEMATOBIA SERRATA." Country Gentleman, Nov. 29, p. 893.
614. ——— 1889a. THE COW-FLY. Country Gentleman, Aug. 1, p. 579.
615. ——— 1889b. FIFTH REPORT ON THE INJURIOUS AND OTHER INSECTS OF THE STATE OF NEW YORK. 42d Rep. N.Y. State Mus. Nat. Hist., pp. 151-344.

616. ——— 1891. ENTOMOLOGICAL. Country Gentleman, Sept. 10, p. 735.
617. ——— 1892a. THE COW-HORN FLY. Country Gentleman, June 30, p. 501.
618. ——— 1892b. WILL THE COW-HORN FLY REMAIN WITH US? Country Gentleman, Oct. 13, p. 769.
619. ——— 1892c. THE COW-HORN FLY IN NEW YORK. Country Gentleman, Nov. 10, p. 847.
620. ——— 1893. EIGHTH REPORT ON INJURIOUS AND OTHER INSECTS OF THE STATE OF NEW YORK. 45th Rep. N.Y. State Mus. Nat. Hist., pp. 121-320.
621. ——— 1897. COW-HORN FLY. Country Gentleman, May 6, p. 350.
622. LIST, G. M. 1952. PERSISTENCE OF DDT ON A TREATED SURFACE AS SHOWN BY HOUSE FLY KNOCKDOWN AND KILL. J. Econ. Entomol. 45(1) : 127-129.
After 7 years horn flies were still being killed by surfaces treated with 5 percent DDT.
623. LOCKHEAD, W. 1904. PROGRESS OF ECONOMIC ENTOMOLOGY IN ONTARIO. Entomol. Soc. Ont. Annu. Rep. 34(1903) : 22.
624. ——— 1906. INJURIOUS INSECTS OF 1905 IN ONTARIO. Entomol. Soc. Ont. Annu. Rep. 36(1905) : 129.
625. LOFGREN, C. S. 1970. ULTRA LOW VOLUME APPLICATIONS OF CONCENTRATED INSECTICIDES IN MEDICAL AND VETERINARY ENTOMOLOGY. Annu. Rev. Entomol. 15: 337-338.
Use of ULV sprays has been successful against horn flies and face flies in the Dakotas.
626. LOOMIS, E. C., D. C. CANNON, C. W. RIMBEY, and L. L. DUNNING. 1969. DUST BAGS FOR HORN FLY CONTROL ON BEEF CATTLE. Calif. Agric. 23 : 8-11.

627. LOVE, J., C. HOELSCHER, and R. COMBS. 1968. HORN FLIES NOT INCRIMINATED IN ANAPLASMOSIS TRANSMISSION IN LABORATORY STUDY. Miss. Agric. Exp. Stn. Inform. Sheet 1049, 1 p.
628. LUDRICK, J. N. 1947. DEATH KNELL FOR HORN FLIES. Prog. Farmer. (Texas ed.) 62(4) : 42.
629. LUGGER, O. 1896. INSECT INJURIOUS IN 1896. Minn. Agric. Exp. Stn. Bull. No. 48.
630. LYLE, C., and H. H. LEVECK. 1956. Miss. Agric. Exp. Stn. Annu. Rep., 69(1956) : 28.
631. ——— and H. H. LEVECK. 1957. Miss. Agric. Exp. Stn. Annu. Rep., 70(1957) : 26, 58.
632. ——— and H. H. LEVECK. 1958. Miss. Agric. Exp. Stn. Annu. Rep., 71(1958) : 60.
633. ——— and H. H. LEVECK. 1959. Miss. Agric. Exp. Stn. Annu. Rep., 72(1959) : 66.
634. MACFIE, J. W. S. 1915. BABESIASIS AND TRYPANOSOMIASIS AT ACCRA, GOLD COAST, WEST AFRICA. Trop. Med. Parasitol. Ann. 9(4) : 457-494.
Lyperosia may be vector of trypanosomiasis.
635. MACKERRAS, I. M. 1932. BUFFALO FLY INVESTIGATIONS. A NOTE ON THE OCCURRENCE OF "HYDROTAEA AUSTRALIS" MALLOCH IN NORTHERN AUSTRALIA. J. Coun. Sci. Ind. Res. Aust. 5 : 253-254.
Larvae of *H. australis* prey on other diptera in dung; the breeding of the buffalo fly is not hampered by this predator and introductions of other species of the genus would probably give poor results.
636. ——— 1933. THE TAXONOMY OF "LYPEROSIA EXIGUA" DE MEIJERE (DIPTERA: MUSCIDAE). Ann. Mag. Nat. Hist. 10(61) : 58-64.
637. ——— 1947. RECENT DEVELOPMENTS IN THE CONTROL OF CATTLE TICK AND BUFFALO FLY. Aust. Vet. J. 23 : 185-189.

638. MACLACHLAN, J. D. 1952. STUDIES ON HOUSE FLY CONTROL IN STABLES AND HORN FLY CONTROL ON CATTLE. Dept. Entomol. and Zoo. Res., Ont. Agric. Coll. Exp. Farm Annu. Rep. 76(1951): 46.
639. MACNAY, C. G. 1953. Can. Insect Pest Rev. 31: 17, 25, 112, 189.
640. ——— 1954. Can. Insect Pest Rev. 32: 18, 25, 52, 69, 118, 227, 381.
641. ——— 1955. Can. Insect Pest Rev. 33: 79, 123.
642. ——— 1956. Can. Insect Pest Rev. 34: 38.
643. ——— 1957. Can. Insect Pest Rev. 35: 36, 114.
644. ——— 1958. Can. Insect Pest Rev. 36: 25, 118, 150, 218, 314.
645. ——— 1959. Can. Insect Pest Rev. 37: 21, 27, 41, 115, 208, 290.
646. ——— 1960. Can. Insect Pest Rev. 38: 65, 103, 214, 306.
647. ——— 1961. Can. Insect Pest Rev. 39: 24, 63, 291, 317, 350.
648. ——— 1962. Can. Insect Pest Rev. 40: 119, 180, 206.
649. ——— 1965. Can. Insect Pest Rev. 43: 180, 209.
650. MACQUART, M. 1835. HISTOIRE NATURELLE DES INSECTES (DIPTERES). Librairie Encyclopedique Roret. Pourrat Freres, Paris, pp. 242-244.
Description and habits of species of *Haematobia* found in Europe.
651. MAHONEY, D. F. 1958. BACK-RUBBERS TO KILL BUFFALO FLY. Queensl. Agric. J. 84(9): 511-515.
Effective control was obtained with DDT on back-rubber.

652. MAILEN, T. H. 1941. SEASONAL OCCURRENCE AND THE EFFECT OF HOST ATTRACTIVENESS ON THE ABUNDANCE OF STABLE FLIES AND HORN FLIES ON CATTLE. Okla. Acad. Sci. Proc. 21: 19-21.

Horn fly population ranged from 276 to 5,566 flies/cow; variation in the attractiveness of individuals was responsible for the spotty data.

653. MALLOCK, J. R. 1932. EXOTIC MUSCARIDAE (DIPTERA)—xxxvi. Ann. Mag. Nat. Hist. 9 (52-54): 377-405, 421-447, 501-518.

Classification of the Stomoxydinae; including *Lyperosia*, and *Haematobia* discussed.

654. MANSFIELD-ADERS, W. 1923. TRYPANOSOMIASIS OF STOCK IN ZANZIBAR. R. Soc. Trop. Med. Hyg. Trans. 17(3): 192-200.

Trypanosoma congolense was found in areas where tabanids were abundant; parasite was less common in areas heavily populated by *Lyperosia* and *Stomoxys*.

655. MARLATT, C. L. 1910. THE HORN FLY ("HAEMATOBIA SER-RATA" ROB.-DESV.). U.S. Dep. Agric. Bur. Entomol. Circ. 115.

Reported early investigations of the horn fly in U.S.; life history and natural enemies of the fly discussed. Recommended letting hogs free in pasture with cattle as they will root through and scatter the cow dung.

656. ——— 1928. REPORT (1927-28) OF THE ENTOMOLOGIST. U.S. Dep. Agric., 34 pp.

657. MARSHALL, G. 1934. BUFFALO FLY. J. Coun. Sci. Industr. Res. Aust. 7: 55-56.

Proposed maintenance of quarantine measures to control spread of fly.

658. MARTEN, J. 1892. THE HORN FLY. Prairie Farmer, Aug. 13.

659. ——— 1893. THE HORN FLY. Prairie Farmer, July 1, p. 12.

660. MATTHYSSE, J. G. 1946. DDT TO CONTROL HORN FLIES AND

GULF COAST TICKS ON RANGE CATTLE IN FLORIDA. J. Econ. Entomol. 39(1) : 62-65.

Most effective methods, concentrations of insecticide for best control, insects affected by treatment and importance of weather conditions for successful fly control were discussed.

661. McALISTER, L. C., H. A. JONES, and D. H. MOORE. 1947. PIPERONYL BUTOXIDE WITH PYRETHRINS IN WETTABLE POWDERS TO CONTROL CERTAIN AGRICULTURAL AND HOUSEHOLD INSECTS. J. Econ. Entomol. 40(6) : 905-909.

Pyrethrins with PB gave cattle 3-day protection from horn flies.

662. MCCARTHY, G. 1896. PARASITES OF DOMESTIC ANIMALS. N.C. Agric. Exp. Stn. Bull. No. 127, pp. 101-142.

663. McDONALD, R. E. 1919. THE STABLE FLY. Tex. Agric. Dep. Mon. News Bull. 2(3) : 3.

664. McDOWWELL, C. H. 1945. PANORAMA OF AGRICULTURAL RESEARCH. Tex. Agric. Exp. Stn. Annu. Rep., 58(1945) : 54-56.

665. McDUFFIE, W. C. 1959. CURRENT STATUS OF INSECTICIDE RESISTANCE IN LIVESTOCK PESTS. RESEARCH PROGRESS ON RESISTANCE. Misc. Publ. Entomol. Soc. Am. 2(1) : 175.

Horn fly believed to be resistant to DDT and other chlorinated compounds.

666. McEACHRAN, J. F. 1915. Annu. Rep. Vet. Stock Dep. Rep. Admin. North. Terr. Aust.

667. MCGREGOR, W. S. 1946a. DDT FOR THE CONTROL OF HORN FLIES AND LICE. Coastal Cattleman 12(7) : 28.

668. ——— 1946b. DDT FOR THE CONTROL OF HORN FLIES AND LICE. Milk Prod. 11(8) : 3.

669. ——— 1949. FIELD TESTS OF INSECTICIDES AND SPRAYING METHODS FOR CONTROL OF HORN FLIES IN DAIRY HERDS. J. Econ. Entomol. 42(4) : 641-643.

Four chlorinated hydrocarbon insecticides were compared for horn fly control on dairy cattle.

670. ——— and R. C. BUSHLAND. 1956. RESEARCH ON THE USE OF SYSTEMIC INSECTICIDES FOR THE CONTROL OF LIVESTOCK PESTS. *J. Econ. Entomol.* 49(1): 86-88.

671. ——— and W. O. MILLER. 1958. TROLENE AND KORLAN SHOW PROMISE FOR PARASITE CONTROL IN SHEEP. *Down Earth* 14(2): 9.

Horn flies often cause annoyance to sheep; easily controlled with Korlan dip.

672. ——— L. L. WADE, and R. W. COLBY. 1958. SYSTEMIC CONTROL OF "DERMATOBIA HOMINIS" (L.) IN CENTRAL AND SOUTH AMERICAN CATTLE WITH NARLENE INSECTICIDE. *J. Econ. Entomol.* 51(5): 724-725.

Horn fly was also controlled.

673. McLINTOCK, J., and K. P. DEPNER. 1954. A REVIEW OF THE LIFE HISTORY AND HABITS OF THE HORN FLY, "SIPHONA IRRITANS" (L.) (DIPTERA: MUSCIDAE). *Can. Entomol.* 86(1): 20-33.

The available literature on the life history of the horn fly is reviewed; recent laboratory observations on habits and behavior are included. Data presented for optimum development temperature of larvae, humidity preference, mating behavior, and egg maturation and oviposition.

674. ——— and K. R. DEPNER. 1957. PRELIMINARY ATTEMPTS TO ESTABLISH A LABORATORY COLONY OF THE HORN FLY, "SIPHONA IRRITANS" (L.) (DIPTERA: MUSCIDAE). *J. Parasitol.* 43(2): 209-212.

Not too successful; use of stanchioned calf did not support horn flies well.

675. M'DONALD, J. A. 1902. FLY PREVENTIVES AND THEIR ECONOMY. *Am. Agric.*, June 28, p. 822.

676. MEDLEY, J. G., R. O. DRUMMOND, and O. H. GRAHAM. 1963. FIELD TESTS WITH LOW-LEVEL FEEDING OF RONNEL FOR CONTROL OF CATTLE GRUBS AND HORN FLIES. *J. Econ. Entomol.* 56(4): 500-503.

Four groups of cattle were fed ronnel in a mineral supplement in feed or in mineral blocks in pastures. Populations of horn flies were reduced during feeding period and for about 1 week thereafter. Fly populations varied considerably from group to group and from week to week within a group.

677. MEIGEN, J. W. 1803. VERSUCH EINER NEUEN GATTUNGSEIN-
THEILUNG ER EUROPÄISCHEN ZWEIFLUGELIGEN INSEKTEN.
Mag. f. Insektenkunde 2: 281.

Original description of the genus *Siphona* (= *Haematobia*).

678. ——— 1824. SYSTEMATISCHE BESCHREIBUNG DER BEKANNTEN
ZWEIFLUGELIGEN INSEKTEN. Vol. 4, p. 161.

Original type species and description of *Haematobia stimulans*.

679. MEIJERE, J. H. C. DE. 1903. VERDERE MEDEDEELINGEN OVER
SURRA. Mededeel. Proefstation Oost-Java. 3e Ser., No. 44.

680. ——— 1904. NEUE UND BEKANNTE SUDOSTASIATISCHE
DIPTEREN. Bijdr. Dierkd. 17-18.

Original description of the buffalo fly, *H. exigua*.

681. MELVIN, R. 1934. INCUBATION PERIOD OF EGGS OF CERTAIN
MUSCOID FLIES AT DIFFERENT CONSTANT TEMPERATURES.
Ann. Entomol. Soc. Am. 27(3): 406-410.

Both high and low temperatures prolong horn fly incubation period; eggs did not hatch at temperatures of 104° F and higher.

682. ——— and D. E. BECK. 1931. LENGTH OF THE DEVELOPMENTAL
STAGES OF THE HORN FLY, "HAEMATOBIA IRRITANS" (L.), AT
CONSTANT TEMPERATURE. J. Econ. Entomol. 24(1): 330-331.

Egg incubation at 25° C was 19 hrs 39 min; 30° incubation was 14 hrs 25 min. Total developmental period for egg, larva, and pupa at 30° was 238 hrs 4 min.

683. MERCIER, L. 1925. DIPTERES "BUVEURS DE SANG" ET DIPTERES
"SUCCEURS DE SUEUR." LEUR ASSOCIATION POSSIBLE

DANS LA PROPOGATION DE CERTAINES MALADIES D'ORIGINE MICROBIENNE. Contrib. R. Soc. Biol. 92(3) : 135-136.

Horn fly was a common cattle fly in Normandy, France.

684. MERRILL, G. B. 1915. PROGRESS REPORT ON INVESTIGATIONS RELATIVE TO THE HORN FLY. Board Comm. Agric. P.R. 3rd Rep. 1913-14 : 53-54.

One of earliest references on horn fly in Puerto Rico.

685. MESNIL, L. P. 1954. GENRES ACTIA ROBINEAU-DESVOIDY ET VOISINS (DIPTERA, BRACHYCERA, CALYPTRATAE). Inst. Parcs Nat. Congo Belge. Exploration du Parc Nat'l. Albert. Mission G. F. de Witte (1933-1935) 81, 41 pp.

686. ——— 1957. NOUVEAUX TACHINAIRES D'ORIENT. 2. Mem. Soc. R. Entomol. Belg. 89, 80 pp.

687. MICKLE, and GOODMAN. 1949. EXTERNAL PARASITES OF LIVESTOCK. Colo. A. & M. Coll. Ext. Bull. No. 406-A, pp. 9-11.

688. MILLER, A., and R. L. HARRIS. 1970. A COLLECTOR FOR STUDYING THE EMERGENCE PATTERN OF FLIES. J. Econ. Entomol. 63(5) : 1682-1683.

An interval collector, operated on the turntable principle, was constructed to study the emergence pattern of horn flies.

689. MILLER, R. F., and E. C. LOOMIS. 1966. CONTROL OF HORN FLIES ON RANGE CATTLE WITH SYSTEMIC INSECTICIDES. Calif. Agric. 20(8) : 8-10.

Ronnel fed at rate of 2 grams per head per day caused a reduction in number of horn flies.

690. MILLER, R. L. 1964. MAKING AND USING A CATTLE BACK-RUBBER. Univ. Ky. Agric. Ext. Serv. Misc. 307, 4 pp.

691. MITCHENER, A. V. 1929. INSECTS OF THE SEASON, 1929 IN MANITOBA. Entomol. Soc. Ont. Annu. Rep., 60(1929) : 25.

692. ——— and N. CRIDDLE. 1931. INSECTS OF THE SEASON, 1930 IN MANITOBA. Entomol. Soc. Ont. Annu. Rep. 61(1930) : 22.

693. MITZMAIN, M. B. 1912. COLLECTED NOTES ON THE INSECT TRANSMISSION OF SURRA IN CARABAOS. Philipp. Agric. Rev. 5 (12) : 670-681.
Carabao louse found attached to legs of *Lyperosia*; 1 in 3 flies were carrying the louse.
694. ——— 1913. THE SURRA-CONVEYING FLY OF THE PHILIPPINES AND SOME FACTORS CONCERNING IN CONTROL MEASURES. Philipp. Agric. Rev. 6 (8) : 371-379.
Lyperosia was eliminated as possible vector of surra.
695. MOHLER, J. R., A. E. WRIGHT, W. M. MACKELLAR, and F. C. BISHOPP. 1942. LOSSES CAUSED BY ANIMAL DISEASE AND PARASITES. U.S. Dep. Agric. Yearb. 1942: 116.
Losses because of the presence of horn fly and stable fly were estimated to be \$10,000,000.
696. MOHR, C. O. 1934. A STUDY OF THE SUCCESSION, RELATIVE NUMBERS AND BIOLOGIES OF BUCOPHROPHILOUS INSECTS. Univ. of Ill. (Ph.D. dissertation.)
697. ——— 1943. CATTLE DROPPINGS AS ECOLOGICAL UNITS. Ecol. Monogr. 13: 275-298.
Horn flies were first to oviposit in fresh cow dropping. Recovered 151.7 adult horn flies per pat during summer months; 56 percent of the adult horn fly population were females. Area where manure was dropped influenced the insect species that inhabited the pat.
698. MONFRAIS, G. 1923. CONTRIBUTION A L'ETUDE DE LA "HORSE SICKNESS" AU SENEGAL. SYMPTOMATOLOGIE, ETIOLOGIE, TRAITEMENT. Bull. Comite Etudes hist. and scientif. Afr. occid. Fr. 6 (4) : 683-689.
Lyperosia may transmit horse sickness.
699. MOORE, D. H., W. E. DOVE, and B. C. DICKINSON. 1954. FLY CONTROL ON LIVESTOCK. Agric. Chem. 9 (8) : 31-34, 109, 111, 113, 115, 117.
700. MOORE, E. L. 1903. FLIES. S. Dak. Agric. Exp. Stn. Bull. 81, pp. 41-42.
701. MOORE, S., A. H. TOCZYDLOWSKI, and H. L. SWEETMAN. 1951. FLY CONTROL EXPERIMENTS IN MASSACHUSETTS IN

1950. J. Econ. Entomol. 44(5) : 731-733.

Lindane vapor gave good horn fly control in barns.

702. MORGAN, H. A. 1892. THE HORN FLY. Crop. Rep. Bur. Agric. La., Ser. of 1892, Circ. 2.

703. ——— 1893. REPORT OF THE ENTOMOLOGIST. La. Agric. Exp. Stn. Bull. No. 22, pp. 982-1005.

704. MORGAN, N. O. 1964. AUTECOLOGY OF THE ADULT HORN FLY, "HAEMATOBIA IRRITANS" (L.) Ecology 45(4) : 728-736.

Experiments were conducted to determine the relationship of weather conditions to horn fly populations on three breeds of dairy cattle. Macroclimate and microclimate of horn fly was discussed. Preferred macroclimate was 73°-80° F, 65-90 percent RH, scattered light showers, and no wind. Preferred microclimate was 85° air temperature, 97° skin temperature, and 65 percent RH. Flies move around body of host to find most comfortable environment.

705. ——— 1966a. LABORATORY PROPAGATION OF THE HORN FLY, "HAEMATOBIA IRRITANS" (L.). J. Econ. Entomol. 59(4) : 1030.

Methods of horn fly rearing discussed. Peak egg production occurred 9 to 15 days after adult fly emergence; many females found to oviposit after fifth week in captivity.

706. ——— 1966b. ULTRA-VIOLET RADIATION AS AN ATTRACTANT FOR ADULT HORN FLIES. J. Econ. Entomol. 59(6) : 1416-1419.

UV light was more attractive to horn flies than a cow at night.

707. ——— 1967. CONTROL OF HORN FLIES BY AN ELECTRO-CHEMICAL DEVICE. J. Econ. Entomol. 60(3) : 750-752.

UV light attracted flies to surface treated with Shell SD-8447.

708. ——— and R. R. BLUME. 1966. LABORATORY TECHNIQUE FOR EVALUATING AND DETECTING HORN FLY POPULATIONS

THAT ARE SUSCEPTIBLE OR TOLERANT TO FOUR INSECTICIDES BY USING A MODIFIED WHO TEST KIT. *J. Econ. Entomol.* 59(3) : 749-750.

709. ——— and O. H. GRAHAM. 1966. INFLUENCE OF CATTLE DIET ON SURVIVAL OF HORN FLY LARVAE. *J. Econ. Entomol.* 59(4) : 835-837.

Four roughages (alfalfa, sorghum, prairie hays, green oats) were evaluated for their influence on the suitability of the cattle dung for larval growth of the horn fly. Adult emergence was lowest from pupae produced in prairie hay feces.

710. ——— and C. D. SCHMIDT. 1966a. THE PH TOLERANCES OF THE HORN FLY ("HAEMATOBIA IRRITANS") LARVAE. *J. Econ. Entomol.* 59(1) : 222-223.

Pupal formation occurred only in pH range greater than 5.5 and less than 9.5.

711. ——— and C. D. SCHMIDT. 1966b. VARIATIONS IN THE COLOR OF EGGS OF THE HORN FLY. *J. Econ. Entomol.* 59(4) : 882-884.

Dark brown eggs are deposited first; percentage of fertility and sex ratio was same for all colors of eggs. Eighty percent of eggs were dark and 20 percent were lighter colored when oviposition was induced. Only 5 percent of the eggs were light colored with natural oviposition.

712. MORRIS, H. 1918. BLOOD-SUCKING INSECTS AS TRANSMITTERS OF ANTHRAX OR CHARBON. *La. State Univ. Agric. Exp. Stn. Bull. No. 163*, 15 pp.

Horn fly could mechanically transmit anthrax.

713. ——— 1920. SOME CARRIERS OF ANTHRAX INFECTION. *J. Am. Vet. Med. Assoc.* 56(6) : 606-608.

Horn fly could mechanically transmit anthrax.

714. ——— J. A. MARTIN, and W. T. OGLESBY. 1936. AN ATTEMPT TO TRANSMIT ANAPLASMOSIS BY BITING FLIES. *J. Am. Vet. Med. Assoc.* 89(2) : 169-175.

Horn fly could not transmit anaplasmosis.

715. MORRIS, W. E., and A. L. HARVEY. 1954. BEEF PRODUCTION. Univ. Maine Agric. Ext. Serv. Ext. Bull. 146, p. 30. (Rev.)
716. MORRISON, F. O. 1947a. FLIES HERE THEY COME. DDT! EM! Can. Jersey Breed. 2(7) : 15, 29-31.
717. ——— 1947b. CONTROLLING THE FLY PLAGUE. Can. Dairy Ice Cream J. 26(11) : 66.
718. MORRISON, H. E., R. W. LAUDERDALE, H. H. CROWELL, and D. C. MOTE. 1950. SPACE SPRAYING FOR FLY CONTROL IN DAIRY BARNS. J. Econ. Entomol. 43(6) : 846-850.
Sprays controlled horn flies, but contaminated the milk.
719. MUESEBECK, C. F. W., and K. V. KROMBEIN. 1951. HYMENOPTERA OF AMERICA NORTH OF MEXICO. U.S. Dep. Agric., Agric. Monogr. No. 2, pp. 535, 602.
Lists the various hymenopterous parasites of the horn fly in the United States.
720. MULLETT, R. P. 1955. CONTROL HORN FLY WITH BACK-RUBBER. Dairy News (Memphis) 13(7) : 3.
721. MUMA, M. H. 1946. CONTROLLING HORN FLIES AND STABLE FLIES WITH DDT. Nebr. Agric. Coll. Ext. Circ. 1542, 4 pp.
722. MUNRO, J. A. 1960. A SPECIAL SURVEY OF BOLIVIAN INSECTS. U.S. Dep. Agric. Coop. Econ. Insect Rep. 10(45) : 1064.
Haematobia exigua was collected from cattle in Bolivia.
723. MURIE, A. 1934. THE MOOSE OF ISLE ROYALE. Univ. Mich. Mus. Zool. Misc. Publ. No. 25, p. 18.
Haematobia alcis was found on moose; believed lost when first described in 1891. Fly wounds caused formation of raw spots on legs of moose.
724. MURTFELDT, M. E. 1891. REPORT ON ENTOMOLOGY. State Hort. Soc. Mo. Annu. Rep. 1890 : 80-85.
Horn fly present in Missouri.
725. ——— 1893. THE HORN FLY HERE. Colman's Rural World, June 1, p. 169.

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727. ——— 1894. INJURIOUS INSECTS OF THE SEASON OF 1893. State Hort. Soc. Mo. Annu. Rep. 1893: 104-121.
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730. ——— 1938. REPORT ON THE NATURAL ENEMIES IN HAITI OF THE HORN FLY ("LYPEROSIA IRRITANS") AND THE GREEN TOMATO BUG ("NEZARA VIRIDULA"). J. Counc. Sci. Ind. Res. Aust. 11(1): 35-46.
Dung predators and parasites of the horn fly had little effect on the total population of flies. Most efficient predator appeared to be *Hister coenosus*.
731. NABOKOV, V. A., and M. F. SHLENOVA. 1955. BLOOD SUCKING DIPTERA. BIOLOGY AND CONTROL. (In Russian.) Medgiz. (Moscow), pp. 1-163.
732. NEAL, J. C. 1892. INSECTS. Okla. Agric. Exp. Stn. Bull. No. 3, p. 20.
733. NEEL, W. W. 1957a. CONTROL OF HORN FLIES ON CATTLE. Miss. Farm Res. 20(3): 8.
734. ——— 1957b. EFFECT OF HORN FLY CONTROL ON MILK PRODUCTION. (Abstract.) Assoc. South. Agric. Workers Proc. 54: 139-140.
735. ——— 1957c. THE EFFECTIVENESS OF NEW REPELLENT FOR THE CONTROL OF HORN FLIES ON DAIRY CATTLE. J. Econ. Entomol. 50(4): 502-503.

No significant difference was observed in milk production between treated and untreated cattle.

736. ——— 1960. METHODS OF CONTROLLING HORN FLIES ON DAIRY CATTLE COMPARED. Miss. Agric. Exp. Stn. Inform. Sheet 668, 2 pp.
Dust-type backrubber proved to be most effective; one charge lasted throughout the season.
737. ——— J. C. TAYLOR, and Z. F. BOWLIN. 1962. STATION TESTS FOUR METHODS OF HORN FLY CONTROL. Miss. Farm Res. 25 (5) : 1-3.
Dust-type backrubbers and pour-on insecticide applications gave best horn fly control.
738. NESBITT, R. T. 1892. THE HORN FLY. Ga. Crop Rep., pp. 15-16.
739. ——— 1894. THE HORN FLY. Ga. Crop. Rep., pp. 92-93.
740. NETTLES, W. C., J. B. KISSAM, T. R. ADKINS, and L. F. CATO. 1967. CONTROL HORN FLIES ON BEEF CATTLE WITH CABLE BACKRUBBERS. Clemson Univ. Ext. Circ. 392, 6 pp. (Rev.)
741. NEWMAN, L. J. 1925. REPORT OF THE ECONOMIC ENTOMOLOGIST. West. Aust. Dep. Agric. Annu. Rep. 1924-25 : 22-24.
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To prevent the spread of buffalo fly by ships carrying cattle, all cattle were sprayed and no manure was permitted to be transported off the ships.
744. ——— 1929. REPORT OF THE ENTOMOLOGIST. West Aust. Dep. Agric. Annu. Rep. 1928-29, pp. 32-33.
Danger exists that buffalo fly may be transported to southwest Australia by cattle shipments.
745. NIESCHULTZ, O. 1927. ZOOLOGISCHE BIJDRAGEN TOT HET SURRAPROBLEEM. XIX. OVERBRENGINGSPROEVEN MET "STOMOXYS," "LYPEROSIA," "MUSCA" EN "STEGOMYIA." Veeartsenijk. Meded. No. 64, 20 pp.

Attempts to transmit surra from horse to horse by buffalo fly were unsuccessful.

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Anthrax could not be transmitted by buffalo fly.
747. ——— and F. C. KRANEVELD. 1929. EXPERIMENTELLE UNTERSUCHUNGEN UBER DIE UEBERTRAGUNG DER BUFFEL-SEUCHE DURCH INSECTEN. Zentrabl. Bakteriologie. 108:403.
Experiments to transmit various infectious diseases of buffalos were unsuccessful using buffalo fly.
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749. NISHIDA, T. 1948. REPORT OF THE UNIV. HAWAII AGRIC. EXP. STN. FOR THE BIENNIIUM ENDING JUNE 30, 1948, p. 74.
750. NOBAR, J., and A. M. ANNAND. 1963. AN "IN VITRO" COMPARISON OF THE EFFECTIVENESS OF DDT AND SEVIN AGAINST BUFFALO FLY. Aust. Vet. J. 39(6): 227-230.
751. NORGAARD, V. A. 1906. DIVISION OF ANIMAL INDUSTRY. REPORT FOR THE YEAR ENDING DEC. 31, 1905, WITH SUBSEQUENT NOTES. 2d Annu. Rep. Board Comm. Agric. Forest., Terr. Hawaii, Year Ending Dec. 31, 1905, pp. 171, 211-212.
Sheep were attacked by horn fly; spread of scabies in sheep was attributed to horn fly. Propagation of horn fly parasites was recommended for fly control.
752. NORRIS, K. R. 1946a. CONTROL OF THE BUFFALO FLY BY DDT. Primary Prod. (Sydney) 23(5): 3.
753. ——— 1946b. DDT FOR BUFFALO FLY. Country Life (Sydney) 57 (42, Beef Cattle Ann.): 12.
754. ——— 1946c. THE TESTING OF THE AMERICAN HORN FLY TRAP, AND A NEW TYPE OF TRAP INVOLVING THE USE OF DDT AGAINST THE BUFFALO FLY, "SIPHONA EXIGUA." J. Counc. Sci. Ind. Res. Aust. 19(1): 65-76.

Use of American flytrap was successful on buffalo fly; another trap, based on the phototrophism of the fly was also used. DDT sprayed on the inside of the traps increased their efficiency.

755. ——— 1947. THE USE OF DDT FOR THE CONTROL OF THE BUFFALO FLY ("SIPHONA EXIGUA" DE MEIJERE). J. Coun. Sci. Ind. Res. Aust. 20(1): 25-42.
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No residues were found in milk from cows treated with coumaphos or gardona; low residues were present in milk from cows treated with other compounds.
757. O'KANE, W. C. 1915. INJURIOUS INSECTS, HOW TO RECOGNIZE AND CONTROL THEM. P. 379. New York.
758. O'KEEFFE, L. E., and E. P. DUREN. 1969. HORN FLY CONTROL WITH INSECTICIDE-DUST BAGS. Univ. Idaho Ext. Curr. Inform. Ser. 108, 4 pp.
759. OLSON, T. M. 1950. ELEMENTS OF DAIRYING. Pp. 377-379. New York.
760. OSBORN, H. 1891a. SOME INSECTS DESTRUCTIVE TO GRASS. Iowa Agric. Exp. Stn. Bull. No. 13, pp. 95-115.
761. ——— 1891b. THE ORANGE JUDD FARMER. Nov. 21, p. 325.
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765. ——— 1902. SOME NOTABLE INSECT OCCURRENCES IN OHIO FOR THE FIRST HALF OF 1902. U.S. Dep. Agric. Div. Entomol. Bull. No. 37 (n.s.), pp. 115-116.
766. OSTEN-SACKEN, C. R. 1889. Insect Life 2: 191.
Letter from author stating that *Haematobia serrata* and *H. irritans* were the same species.
767. PAGDEN, H. T. 1934. ANNUAL REPORT OF THE SENIOR ENTOMOLOGIST FOR THE YEAR 1933-34. Brit. Solomon Isl. Agric. Gaz. 2(4): 5-9.
768. PANDELLE, L. 1898. E'TUDES SUR LES MUSCIDES DE FRANCE. Rev. Fr. Entomol., July 1898, pt. 2, p. 44.
769. PARISH, H. E. 1942. FACTORS PREDISPOSING ANIMALS TO SCREW WORM INFESTATION IN TEXAS. J. Econ. Entomol. 35(6): 899-903.
Over 32 percent of screwworm infestations were the result of wounds made on cattle by the horn fly.
770. PARMAN, D. C. 1920. OBSERVATIONS ON THE EFFECT OF STORM PHENOMENA ON INSECT ACTIVITY. J. Econ. Entomol. 13(4): 339-343.
Horn flies became nervous and then comatose; flies were attracted to lights and were more active when barometer was rising.
771. PARROTT, P. J. 1899a. A HORN FLY TRAP EXPERIMENT. Kans. State Agric. Coll. Entomol. Dep. Press Bull. 49.
Experiments with trap were unsuccessful; only caught 5 percent of the horn flies on cattle.
772. ——— 1899b. HORN FLY REMEDY. Kans. Farmer, July 13, p. 471.
773. ——— 1900. HORN FLY REMEDIES. Kans. State Agric. Coll. Entomol. Dep. Press Bull. 65.
774. PATTON, W. S. 1920. SOME NOTES ON THE ARTHROPODS OF MEDICAL AND VETERINARY IMPORTANCE IN MESOPOTAMIA,

AND ON THEIR RELATION TO DISEASE. PART 2: MESOPOTAMIAN HOUSE FLIES AND THEIR ALLIES. *Indian J. Med. Res.* 7(4): 751-777.

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Lyperosia exigua was present in China.

776. ——— 1933. STUDIES ON THE HIGHER DIPTERA OF MEDICAL AND VETERINARY IMPORTANCE. A REVISION OF THE GENERA OF THE TRIBE MUSCINI, SUBFAMILY MUSCINAE, BASED ON A COMPARATIVE STUDY OF THE MALE TERMINALIA. I. THE GENUS "MUSCA," LINNAEUS. II. THE GENUS "STOMOXYS," GEOFFROY (SENS. LAT.). *Ann. Trop. Med. Parasitol.* 27(1): 135-156; (4): 501-537.

777. ——— and A. M. EVANS. 1929. INSECTS, TICKS, MITES AND VENOMOUS ANIMALS OF MEDICAL AND VETERINARY IMPORTANCE. 396 pp. Croydon.

778. ——— and F. W. GRAGG. 1913. A TEXTBOOK OF MEDICAL ENTOMOLOGY. Pp. 360-370. London.

779. PEAIRS, L. M. 1946. DDT AND HORN FLY POPULATIONS. *J. Econ. Entomol.* 39(1): 91-92.

DDT applied only once during season might control horn flies in many areas for duration of fly season.

780. PEARSON, A. M. 1935a. AN IMPROVED METHOD FOR THE DETERMINATION OF CATTLE FLY SPRAY REPELLENCE. *J. Econ. Entomol.* 28(1): 160-161.

781. ——— 1935b. THE ROLE OF PINE OIL IN CATTLE FLY SPRAYS. *Del. Agric. Exp. Stn. Bull.* No. 196, 63 pp.

Pine oil increased toxicity of pyrethrums.

782. PEMBERTON, C. E. 1934. Hawaii. Sugar Plant. Assoc. *Annu. Rep.* 1934: 26.

783. ——— 1935. ENTOMOLOGY. *Comm. Exp. Stn. Hawaii Sugar Plant. Assoc. Rep.* 1934: 19-26.

The coprid beetle, *Onthophagus incensus* was intro-

duced from Mexico in 1923 and common in dung on Kona Island.

784. ——— 1938. HORN FLY ENEMY. Rep. Comm. Exp. Stn. Hawaii Sugar Plant. Assoc. 1938: 24.
Two specimens of *Sphaeridium scarabaeoides* were recovered from Oahu Island. First time beetles recovered since their introduction in 1909.
785. ——— 1948a. HORN FLY ENEMIES—PROJECT E-5. Hawaii Sugar Plant. Assoc. Annu. Rep. 1947: 21-22.
The scarabaeid beetle, *Canthon humectus*, which was released for horn fly control in 1923, did not become established in the islands until 1947.
786. ——— 1948b. HISTORY OF ENTOMOLOGY DEPARTMENT EXPERIMENT STATION, HAWAIIAN SUGAR PLANTERS ASSOCIATION, 1904-45. Hawaii Plant. Rec. 52(1): 53-90.
History of biocontrol of the horn fly in Hawaii discussed.
787. ——— and F. X. WILLIAMS. 1938. HORN FLY. Hawaii Plant. Rec. 42: 222-223.
788. PEPPER, J. H., J. P. CORKINS, L. H. GRAHAM, and others. 1953. MONTANA INSECT PESTS 1951-52. 34th Rep. State Entomologist. Bull. No. 484, pp. 24-25.
789. ——— J. P. CORKINS, R. SCHMIEDESKAMP, and others. 1951. MONTANA INSECT PESTS. 33d Rep. State Entomologist. Bull. No. 474, p. 30.
790. ——— G. R. ROEMHILD, and L. N. GRAHAM. 1954. MONTANA INSECT PESTS 1953-54. 35th Rep. State Entomologist. Bull. No. 504, p. 20.
Aerial spraying with DDT was effective against horn flies.
791. PERKINS, G. H. 1894. REPORT OF THE ENTOMOLOGIST. Vt. Agric. Exp. Stn. Annu. Rep. 7(1894): 119-145.
792. PERRON, J. P. 1954. "SPALANGIA RUGOSICOLLIS" (ASHM.) (HYMENOPTERA: CHALCIDOIDAE), A NEW PARASITE OF THE

ONION MAGGOT, "HYLEMYA ANTIQUA" (MEIGEN) (DIPTERA: ANTHOMYIIDAE). Can. Entomol. 86(5): 222.

First record of this parasite attacking onion maggot; *S. rugosicollis* is one of more common parasites attacking horn fly.

793. PETERS, L. L. 1969. MAKING AND USING A CATTLE BACK-RUBBER. Univ. Mo., Columbia Ext. Div. 3/69 9M, 2 pp.

794. ——— 1971a. RECOMMENDATIONS FOR FLY CONTROL ON BEEF CATTLE. Sci. Tech. Guide. Univ. Mo., Columbia Ext. Div., 2 pp.

795. ——— 1971b. RECOMMENDATIONS FOR FLY CONTROL ON DAIRY CATTLE. Sci. Tech. Guide. Univ. Mo., Columbia Ext. Div., 2 pp.

796. PETERSON, C. W. 1945. FULL-SCALE TEST OF DDT IS COMPLETED. Southeast Cattleman Dairy J. 5(4): 9, 28.

797. PETROVA, B. K. 1966. DATA ON THE ECOLOGY AND BEHAVIOR OF PASTURE FLIES (DIPTERA) IN THE SOUTH OF THE SOVIET FAR EAST (MARITIME TERRITORY). Entomol. Obozr. (Transl.) 45(1): 42-45.

Horn fly population reached peak at end of August. Greatest fly activity was from 10 a.m. to 7 p.m. Weather conditions influenced the intensity of attack by horn flies.

798. PEUS, F. 1937. ZWEI BISHER UNBEKANNTTE ARTEN DER STECHFLIEGENGATLUNG HAPHOSPATHA ENDERLEIN AUS MITTELEUROPA (DIPT., STOMOXYDIDAE). Z. Angew. Entomol. 24(1): 150-154.

Characters were given for distinguishing *Lyperosia scopolax* and *L. bovina* from other species of *Lyperosia*. *L. scopolax* was found in Hungary; *L. bovina* was found in Latvia.

799. PFADT, R. E., G. R. DEFOLIART, and T. R. ROBB. 1953. CONTROL LIVESTOCK PESTS. Wyo. Agric. Exp. Stn. Bull. No. 327, pp. 26-27.

800. PIERCE, W. D. 1921. SANITARY ENTOMOLOGY. Pp. 232-234. Boston.

801. PINKUS, H. 1913. THE LIFE HISTORY AND HABITS OF "SPALANGIA MUSCIDARUM," A PARASITE OF THE STABLE FLY. *Psyche J. Entomol.* 20: 148-158.

Pupal parasites of horn fly developed in 80 to 100 days depending on temperature.

802. PINTO, C. 1931. HYPOGYGIO ON TERMINALIA DAS MOSCAS HAEMATOPHAGAS STOMOXYDINAE (DIPTERA, MUSCIDAE). *Rev. Med.-Cirurg. (Brazil)*. 39 (7) : 248-258.

Morphology of the genitalia of *Stomoxys calcitrans* and *Lyperosia exigua* was discussed.

803. POINDEXTER, C. E., and T. R. ADKINS. 1970. CONTROL OF THE FACE FLY AND THE HORN FLY WITH SELF-APPLICATORY DUST BAGS. *J. Econ. Entomol.* 63 (3) : 946-948.

Good horn fly control was obtained using a variety of insecticides.

804. POORBAUGH, J. H. 1966. ECOLOGICAL STUDIES ON THE INSECT INHABITANTS OF UNDISTURBED CATTLE DROPPINGS. 157 pp. Univ. Calif., Berkeley, (Ph.D. dissertation).

805. ——— J. R. ANDERSON, and J. F. BURGER. 1968. THE INSECT INHABITANTS OF UNDISTURBED CATTLE DROPPINGS IN NORTHERN CALIFORNIA. *Calif. Vector Views* 15 (3) : 17-36.

Insect community living in fresh cow dung was described, and methods for the survey and assessment were presented. A list of 151 insects attracted to and reared from cow dung was presented. Mortality of coprophagous diptera larvae in cow pats was concluded to be almost totally from entomophagous insects. High numbers of horn and face flies were attributable to the scarcity of natural enemies in the droppings.

806. PORTCHINSKY, I. A. 1910. "STOMOXYYS CALCITRANS;" ITS BIOLOGY IN RELATION TO THAT OF OTHER COPROPHAGOUS FLIES. (In Russian.) *Mem. Bur. Entomol. of the Sci. Committee of the Central Board of Land Admin. and Agric.* 8 (8) : 90. (Abstract in *Rev. Appl. Entomol.* 1: 146-148, 1913.)

Haematobia stimulans and *Lyperosia irritans* found to feed only on the blood of cattle, remaining on the host

even when resting; author believed these habits were the beginnings of well-defined parasitism.

807. PORTMAN, R. W. 1947. DIPPING IN BENZENE HEXACHLORIDE TO CONTROL "AMBLYOMMA AMERICANUM." J. Econ. Entomol. 40(1) : 134-135.

Horn fly population was reduced by use of the dips.

808. ——— and H. C. MANIS. 1958. IDAHO RECOMMENDATIONS FOR INSECT CONTROL. Univ. Idaho Ext. Serv. Bull. 216, p. 23.

809. POSSON, R. J. 1926. EXPERIMENTS IN FLY CONTROL ARE REVIEWED FOR THE BENEFIT OF DAIRY FARMERS AND BOTTLERS OF MILK. Certified Milk 5(1) : 7, 23.

810. PRATT, F. C. 1912. INSECTS BRED FROM COW MANURE. Can. Entomol. 44 : 180-184.

811. PRIDANTSEVA, YE.A. 1959. THE BIOLOGY OF "LYPEROSIA TITILLANS" BEZZI (DIPTERA, MUSCIDAE), AN INTERMEDIATE HOST OF THE NEMATODE "PARABRONEMA SKRJABINI." Entomol. Obozr. (Transl.) 38(1) : 129-138.

Biology and habits similar to horn fly; found to oviposit in dung of cattle and camels.

812. ——— 1967. THE PASTURE FLY FAUNA ASSOCIATED WITH CAMELS IN SOUTH TUVA. Entomol. Obozr. (Transl.) 46(4) : 491-494.

A marked similarity was found between cow and camel dung fly faunas. Most of the insects associated with camels and camel dung belong to the family Muscidae. *Lyperosia titillans* was the most numerous of diptera associated with camels.

813. RAMAKRISHNA AYYAR, T. V. 1920. NOTE ON A MUSCIPHAGOUS WASP ("BEMBEX LUNATA"). Rep. 3d Entomol. Meeting, Pusa, Feb. 1919, Calcutta, Proc. 3 : 909-910. Parasitize *Lyperosia* and other bloodsucking flies.

814. RANSOM, B. H. 1942. PARASITES OF CATTLE. In Diseases of Cattle, U. S. Dep. Agric., Bur. Anim. Ind., pp. 449-452.

815. RAO, M. A. NARAYAN, and S. MAUDALIAR. 1935. SOME OBSERVATIONS ON THE TRYPANOSOMES OF CATTLE IN SOUTH INDIA. *Indian J. Vet. Sci.* 4(4) : 362-398.
816. RAUN, E. S., and D. J. CASEY. 1956. A COMPARISON OF BACK RUBBER FORMULATIONS FOR CONTROLLING HORN AND STABLE FLIES IN IOWA. *J. Econ. Entomol.* 49(3) : 395-397.
All formulations gave good control of the horn fly.
817. ——— and F. E. FRENCH. 1961. PRACTICAL APPLICATION METHODS FOR SYSTEMIC CATTLE GRUB CONTROL. *J. Econ. Entomol.* 54(3) : 428-431.
Toxaphene applied by backrubber gave good horn fly control.
818. REEK, W. R. 1948. DEPARTMENT OF ENTOMOLOGY. Ont. Agric. Coll. Exp. Farm, 1946-47, Ont. Dep. Agric. Annu. Rep. 72(1946-47) : 34-35.
Horn flies were controlled with DDT.
819. REGAN, W. M., and S. B. FREEBORN. 1936. THE EFFECT OF FLIES AND FLY SPRAYS ON CERTAIN PHYSIOLOGICAL PROCESSES OF THE DAIRY COW. *J. Dairy Sci.* 19: 11-28.
Milk loss caused by fly problems has been overestimated; heavy infestations of flies produced negligible milk loss. Milk loss was 22 percent when petroleum base sprays were used.
820. RICKARD, M., W. C. ALLAN, and H. C. GOBLE. 1948. NOTES ON HORN FLIES IN ONTARIO, 1947. *Entomol. Soc. Ont., Annu. Rep.* 78(1947) : 66-67.
821. RICHARDSON, C. H. 1913. STUDIES ON THE HABITS AND DEVELOPMENT OF A HYMENOPTEROUS PARASITE, "SPALANGIA MUSCIDARUM" RICHARDSON. *J. Morphol.* 24: 513-547.
Life history, habits, and hosts of *S. muscidarum* discussed. *Haematobia serrata* was listed as host for *S. muscidarum* and *S. haematobiae*.
822. ——— 1931. SPRAYS FOR FLIES WHICH ATTACK LIVESTOCK. *Iowa Agric. Yearb.* 32(pt. 2) : 31-32

823. RILEY, C. V. 1889a. THE HORN FLY. *Insect Life* 2(4): 60, 93-103.

One of first papers on horn fly in the U.S.; reported appearance of horn fly and reviewed the life history of the fly. Methods of control were discussed.

824. ——— 1889b. THE HORN FLY. U.S. Dep. Agric., First Annu. Rep. Sec. Agric., pp. 345-348.

Recommended treating manure with lime or breaking up pats to prevent development of horn fly.

825. ——— 1890. REPORT OF THE ENTOMOLOGIST FOR THE YEAR, 1889. U.S. Dep. Agric. Annu. Rep. 1889: 331-360.

826. ——— 1891. REPORT OF THE ENTOMOLOGIST. U.S. Dep. Agric. Annu. Rep. 1890: 273-264.

827. ——— 1893. REPORT OF THE ENTOMOLOGIST. U.S. Dep. Agric. Annu. Rep. 1892: 153-180.

828. ——— and L. O. HOWARD. 1889. THE NEW CATTLE-FLY OR HORN FLY. *Insect Life*. 2: 60.

829. ——— and L. O. HOWARD. 1890a. THE HORN FLY. *Insect Life* 3: 20.

830. ——— and L. O. HOWARD. 1890b. THE OVIPOSITION OF THE HORN FLY. *Insect Life* 3: 42-43.

831. ——— and L. O. HOWARD. 1891a. THE HORN FLY IN VIRGINIA. *Insect Life* 3: 471.

832. ——— and L. O. HOWARD. 1891b. THE HORN FLY IN KENTUCKY. *Insect Life* 4: 144.

833. ——— and L. O. HOWARD. 1892a. THE WORK OF THE SEASON. REPORT OF THE ENTOMOLOGIST FOR THE YEAR 1891. U.S. Dep. Agric. Annu. Rep. 1891: 232-246.

834. ——— and L. O. HOWARD. 1892b. THE HORN FLY IN THE SOUTH. *Insect Life* 4: 398.

835. ——— and L. O. HOWARD. 1892c. SPREAD OF THE HORN FLY. *Insect Life* 5: 49.

836. ——— and L. O. HOWARD. 1892d. WIDESPREAD TROUBLE FROM THE HORN FLY. *Insect Life* 5:143.
837. ——— and L. O. HOWARD. 1893. THE HORN FLY IN SOUTH-WESTERN TEXAS. *Insect Life* 5:349.
838. RITCHIE, A. H. 1917. REPORT OF THE GOVERNMENT ENTOMOLOGIST FOR THE YEAR 1916-17. Supplement Jamaica Gaz. 40(4):97-98.
839. ROBBINS, W. E., T. L. HOPKINS, and G. W. EDDY. 1957. METABOLISM AND EXCRETION OF PHOSPHORUS-32 LABELED DIAZINON IN A COW. *J. Agric. Food Chem.* 5(7):509-513.
Horn flies used in bioassay.
840. ROBERTS, F. H. S. 1931. THE BUFFALO FLY ("LYPEROSIA EXIGUA" DE MEIJERE). *Queensl. Agric. J.* 35(3):163-166.
841. ——— 1941. THE BUFFALO FLY ("LYPEROSIA EXIGUA" DE MEIJERE). *Queensl. Agric. J.* 56(1):34-42.
Fly entered Queensland from the north in 1928. Larvae need at least 68 percent moisture content manure for successful development. Buffalo fly was found to dislike dusty areas, cattle in dusty areas will have lower fly populations. Cattle tolerated 1,000 or fewer flies with little or no adverse affects.
842. ——— 1946. THE BUFFALO FLY. *Queensl. Agric. J.* 63(2):112-116.
843. ——— 1952. INSECTS AFFECTING LIVESTOCK, 267 pp. Sydney.
844. ROBERTS, J. E. 1963. CONTROL OF FLIES ON BEEF AND DAIRY CATTLE. *Ga. Exp. Stn. Mimeo. series, N.S. 186.*
Good horn fly control was obtained with pour-ons and backrubbers.
845. ——— 1964. RUBBING DEVICES TREATED WITH INSECTICIDES FOR HORN FLY AND FACE FLY CONTROL ON BEEF CATTLE. *Ga. Exp. Stn. Mimeo. series, N.S. 227, 10 pp.*

Both dust bags and cable-type backrubbers gave good horn fly control when properly maintained.

846. ——— 1965a. INSECTICIDES AS MINERAL ADDITIVES FOR CONTROL OF HORN FLIES ("HAEMATOBIA IRRITANS") AND CATTLE GRUBS ("HYPODERMA LINEATUM"). Ga. Agric. Res. 7(2) : 5-6.
847. ——— 1965b. HORN FLY CONTROL ON BEEF CATTLE WITH INSECTICIDE SPRAYS. Ga. Agric. Res. 7(1) : 14-15.
848. ——— and G. Barnes. 1968. DUST BAGS FOR CONTROL OF HORN FLIES ON BEEF AND DAIRY CATTLE. Arkansas Cattle Bus. 4(6) : 30.
849. ——— P. E. WHITE, and D. M. BAIRD. 1963. FACE FLY AND HORN FLY POPULATION AND CONTROL STUDIES ON CATTLE. Ga. Exp. Stn. Mimeo. series. N.S. 162, 13 pp.
Backrubbers and pour-ons gave good horn fly control; location of backrubber was more important than insecticide used.
850. ROBERTS, R. A. 1930. THE WINTERING HABITS OF MUSCOID FLIES IN IOWA. Entomol. Soc. Am. Ann. 23(4) : 784-792.
Horn fly was frequently observed in late fall; scarce in the spring.
851. ROBERTS, R. H. 1959. FIELD TESTS WITH FIVE INSECTICIDES FOR THE CONTROL OF HORN FLIES. J. Econ. Entomol. 52(6) : 1216-1217.
852. ——— 1964. DUST TESTED FOR HORN FLY CONTROL. Miss. Farm Res. 27(12) : 1, 6.
853. ——— and W. F. CHAMBERLAIN. 1963. FACTORS CONTRIBUTING TO THE LOSS OF INSECTICIDE DEPOSITS ON CATTLE. J. Econ. Entomol. 56(5) : 614-618.
Most of the loss of dermal insecticidal treatments could be accounted for by the action of the tail, contact with the ground, rubbing, and rain.
854. ——— and O. H. GRAHAM. 1963. EFFECTS OF ADDITIVES

ON THE TOXICITY OF PYRETHRINS TO STABLE FLIES AND HORN FLIES. J. Econ. Entomol. 56(5) : 699-702.

Pyrethrins were apparently more difficult to synergize against horn and stable flies than house flies.

855. ——— M. J. WRICH, R. A. HOFFMAN, and C. M. JONES. 1961. CONTROL OF HORN FLIES AND STABLE FLIES WITH THREE GENERAL CHEMICAL COMPOUNDS. J. Econ. Entomol. 54(5) : 1047-1049.

856. ROBINEAU-DESVOIDY, J. B. 1830. ESSAI SUR LES MYODAIRES. (PARIS). Inst. de France, (Cl. des) Sci. Math. et Phys., Acad. Roy. des Sci., Mem. presentes par divers Savans (Ser. 2) 2: 388-389.

Described species of *Haematobia*.

857. ——— 1863. HISTOIRE NATURELLE DES DIPTERES DES ENVIRONS DE PARIS, VOL. 2. Victor Masson et Fils Pub., pp. 608-611.

Described four species of *Haematobia* found in Europe.

858. RODHAIN, J. 1916. NOTE SUR LES TRYPANOSSES ET LES PIROPLASMOSES DES GRANDS ANIMAUX DE L'QUELLE. Bull. Soc. Pathol. Exot. 9(2) : 96-109.

Lyperosia minuta and *L. punctigera* were collected in tropical Africa.

859. ROGOFF, W. M. 1949. LIVESTOCK DISEASES, INSECTS AND POISONING. In Agricultural Research in South Dakota, S. Dak. Agric. Exp. Stn. Annu. Rep. 62(1949) : 63-64.

860. ——— 1950. INSECTS, MITES, AND TICKS AFFECTING CATTLE, SHEEP AND SWINE. S. Dak. Agric. Exp. Stn. Annu. Rep. 63(1950) : 125-126.

861. ——— 1951. AGRICULTURAL RESEARCH IN SOUTH DAKOTA. S. Dak. Agric. Exp. Stn. Annu. Rep. 64(1951) : 45-48.

862. ——— 1952. CABLE-TYPE BACKRUBBERS FOR HORN FLY CONTROL ON CATTLE. S. Dak. Agric. Exp. Stn. Bull. 418, 12 pp.

One of first papers on backrubbers for fly control on cattle. Details of construction were given; effective fly control was obtained.

863. ——— 1954. FLY CONTROL ON THE FARM. AGRICULTURAL RESEARCH IN SOUTH DAKOTA. S. Dak. Agric. Exp. Stn. Annu. Rep. 67(1954): 52-55.
864. ——— 1955. FARM FLY CONTROL. S. Dak. Agric. Exp. Stn. Bull. No. 452, 11 pp.
865. ——— and P. H. KOHLER. 1961. HORN FLY CONTROL BY THE POUR-ON TECHNIQUE USING RUELENE OR TOXOPHENE. J. Econ. Entomol. 54(6): 1101-1104.
Superior control was obtained by the pour-on technique; toxaphene was the better insecticide.
866. ——— P. H. KOHLER, and S. D. HINTZ. 1963. POUR-ON TREATMENTS OF DDT OR TOXAPHENE FOR HORN FLY CONTROL. J. Econ. Entomol. 56(1): 82-83.
Good horn fly control was obtained using both techniques.
867. ——— and A. L. MOXON. 1952. CABLE-TYPE BACKRUBBERS FOR HORN FLY CONTROL ON CATTLE. J. Econ. Entomol. 45(2): 329-334.
Backrubbers provided highly effective control of horn flies under range and feedlot conditions. Nothing hazardous occurred to the cattle from constant back-rubber use over 2 years.
868. ROLFS, P. H. 1892. THE HORN FLY. Fla. Agric. Exp. Stn. Bull. No. 17, pp. 12-14.
869. ROMANOV, A. V. 1940. L'ECOLOGIE DES MOUCHES SYNANTHROPES DU TADJIKISTAN MERIDIONAL. (In Russian.) Med. Parazitol. 9(4): 355-363. Abstr. Rev. Appl. Entomol. (B) 31: 126, 1943.
Lists 21 species of dung insects found in southwest Tadzhikistan. *Lyperosia irritans* was recovered from dung; larval development was found to be completed in 2½ days.
870. RONDANI, C. 1856. DIPTEROLOGIAE ITALICAE PRODROMUS. VOL. 1: GENERA ITALICA ORDINIS DIPTERORUM ORDINATIM DISPOSITA DISTINCTA ET IN FAMILIES ET STIRPES AGGREGATA. Parmae (=Parma), p. 93.
Original description of genus *Lyperosia*.

871. ——— 1862. DIPTEROLOGIAE ITALICAE PRODROMUS. VOL. 5: SPECIES ITALICAE ORDINIS DIPTERORUM IN GENERA CHARACTERIBUS DEFINITA, ORDINATIM COLLECTAE, METHODO ANALITICA DISTINCTAE, ET NOVIS VEL MINUS COGNITIS DESCRIPTIS, PARS QUARTA: MUSCIDAE, PHASIINAE-DEXINAE-MUSCINAE-STOMOXIDINAE. Parmae (=Parma), 239 pp. Description of *Lyperosia*.
872. RONEY, J. N. 1954. CONTROL OF LIVESTOCK PESTS. Ariz. Cattleog. 9(6): 50.
873. ——— and A. LANE. 1965. KILL LIVESTOCK PESTS. Univ. Ariz. Coop. Ext. Serv. Agric. Exp. Stn. Bull. A-13, pp. 9-12.
874. ROSELLE, R. 1955. CONTROL OF HORN FLIES WITH CABLE BACKRUBBERS. Univ. Nebr. Ext. Circ. 1568, 4 pp.
875. ——— 1964. FEED ADDITIVES FOR CONTROL OF HORN AND FACE FLIES. Nebr. Cattleman 20(10): 24.
876. ROSS, W. A., and L. CAESAR. 1924. INSECTS OF THE SEASON. Entomol. Soc. Ont. Annu. Rep. 54(1923): 93.
877. ROUBAUD, E., and R. VANSACEGHEM. 1916. OBSERVATIONS SUR QUELQUES INSECTES ET ACARIENS PARASITES DU BETAIL AU CONGO BELGE. Bull. Soc. Pathol. Exot. 9(10): 763-767.
Lyperosia pallidipes was collected at Zambi, Congo.
878. ROWELL, J. O. 1950. SPRAYING YOUR COWS AND BARN FLIES. Va. Polytech. Inst. Ext. Circ. No. 498, 5 pp.
879. ——— 1965a. CONTROL HORN FLIES ON BEEF CATTLE WITH BACKRUBBERS. Va. Polytech. Inst. Ext. Circ. 812, 4 pp. (Rev.)
880. ——— 1965b. SPRAYING YOUR BEEF CATTLE FOR FLIES. Va. Polytech. Inst. Ext. Circ. 825, 6 pp. (Rev.)
881. ——— 1965c. EXTERNAL PARASITES OF BEEF CATTLE. Va. Polytech. Inst. Ext. Circ. 980, 4 pp.

882. ——— 1966a. 1966 INSECTICIDE RECOMMENDATIONS: EXTERNAL PARASITES OF HORSES. Va. Polytech. Inst. Ext. Leaf. 195, 2 pp.
883. ——— 1966b. 1966 INSECTICIDE RECOMMENDATIONS: EXTERNAL PARASITES OF DAIRY CATTLE. Va. Polytech. Inst. Ext. Circ. 983, 4 pp.
884. ——— 1966c. 1966 INSECTICIDE RECOMMENDATIONS: EXTERNAL PARASITES OF BEEF CATTLE. Va. Polytech. Inst. Ext. Circ. 980, 4 pp.
885. ——— 1967a. CONTROL HORN FLIES ON BEEF CATTLE WITH BACKRUBBERS. Va. Polytech. Inst. Ext. Circ. 812, 4 pp. (Rev.)
886. ——— 1967b. SPRAYING YOUR BEEF CATTLE FOR FLIES. Va. Polytech. Inst. Ext. Circ. 815, 5 pp. (Rev.)
887. SACCA, G. 1948. OBSERVATIONS ON A POPULATION OF FLIES AFTER TREATMENT WITH DDT AND CHLORDANE. (In Italian.) Lst. Super. di Sanit. Rend. 11: 1354-1361.
888. ——— 1949. OBSERVATIONS ON A POPULATION OF FLIES AFTER TREATMENT WITH DDT AND CHLORDANE. (In Italian.) Riv. Parassitol. 10: 59-64.
889. SANBORN, C. E. 1933. INSECT PEST STUDIES. Okla. Agric. Exp. Stn. Rep. 1930-32: 244-248.
890. SANDERS, D. A. 1944. MASTITIS IN HEIFERS FOLLOWING INJURY BY THE HORN FLY. J. Am. Vet. Med. Assoc. 104(806): 284-285.
Lesions on the teats caused by horn flies were scraped and cultured: the presence of streptococci, staphylococci, and diplococci was shown. Mastitis ceased to be a problem on a dairy farm when horn flies were controlled.
891. ——— and A. N. TISSOT. 1945. CONTROL OF INSECT AND ARACHNID PESTS OF CATTLE. Univ. Fla. Agric. Exp. Stn., Annu. Rep. Fiscal Year Ending June 30, 1945, p 66.
892. ——— and A. N. TISSOT. 1946. CONTROL OF INSECT AND

ARACHNID PESTS OF CATTLE. Univ. Fla. Agric. Exp. Stn., Annu. Rep. Fiscal Year Ending June 30, 1946, p. 55.

893. ——— and A. N. TISSOT. 1948. ANAPLASMOSIS IN CATTLE Univ. Fla. Agric. Exp. Stn. Annu. Rep. Fiscal Year Ending June 30, 1948, p. 58.

Reduction in increase of the incidence of anaplasmosis noted when cattle were sprayed for horn flies and Gulf Coast ticks.

894. SANDERS, D. P., and R. C. DOBSON. 1966. THE INSECT COMPLEX ASSOCIATED WITH BOVINE MANURE IN INDIANA. Ann. Entomol. Soc. Am. 59(5): 955-959.

Manure samples were collected in the field and maintained in the laboratory until all adult insects had emerged. Those insects emerged included 20 species of Diptera, 15 species of Coleoptera, and 3 species of Hymenoptera.

895. ——— and R. C. DOBSON. 1969. CONTRIBUTIONS TO THE BIOLOGY OF THE HORN FLY. J. Econ. Entomol. 62(6): 1362-1366.

The abundance of adult horn flies emerging from manure was observed in relation to six measurable variables. A slight increase in frequency of occurrence was noted with increased length of exposure from 2 min to 8 hrs. The female was found to oviposit at any time of day or night. A general increase in the horn fly population was noted in the summer. Wind movements in excess of 6 mi/h had adverse effects on egg deposition. Viscosity and size of the manure pats had a direct effect on number of horn flies emerging from them.

896. SANDERSON, E. D. 1921. INSECT PESTS OF FARM, GARDEN AND ORCHARD. P. 658. New York.

897. SCHEERPELTZ, O. 1934. ZWEI NEUE ARTEN DER GATTUNG "ALEOCHARA" GRAVH. (COLEOPT. STAPHYLINIDAE), DIE AUS DEN PUPPEN VON "LYPEROSIA" (DIPT.) ALS PARASITEN GEZOGEN WURDEN. Rev. Suisse Zool. 41(6): 131-147.

Two species of *Aleochara* were recovered from *L. exigua* pupae.

898. SCHEIBNER, R. A., W. W. GREGORY, and H. G. RANEY. 1971a. 1971 INSECTICIDE RECOMMENDATIONS FOR LACTATING DAIRY ANIMALS. Univ. Ky. Coop. Ext. Serv. Misc. 256-H.
899. ——— W. W. GREGORY, and H. G. RANEY. 1971b. 1971 INSECTICIDE RECOMMENDATIONS FOR BEEF ANIMALS. Univ. Ky. Coop. Ext. Serv. Misc. 280-G.
900. SCHINER, J. R. 1862. FAUNA AUSTRIACA: DIE FLIEGEN. Wien. pp. 520-522.
Described various species of *Siphona* including *S. cristata*, *S. geniculata*, and *S. flavifrons*.
901. SCHMIDT, C. D., R. L. HARRIS, and R. A. HOFFMAN. 1967. MASS REARING OF THE HORN FLY, "HAEMATOBIA IRRITANS" (DIPTERA: MUCIDAE), IN THE LABORATORY. Entomol. Soc. Am. Ann. 60(3): 508-510.
Description of successful horn fly rearing method currently used at Kerrville, Tex.
902. ——— R. L. HARRIS, and R. A. HOFFMAN. 1968. NEW TECHNIQUES FOR REARING HORN FLIES AT KERRVILLE, 1967. Entomol. Soc. Am. Ann. 61(4): 1045-1046.
Changes were adding a twilight effect in the lighting system and changing photoperiods, anticoagulant added to bovine blood, and drying of pupae in a rotary dryer.
903. SEARLS, E. M., and F. M. SNYDER. 1938. CATTLE SPRAYS—THEIR COMPOSITION AND APPLICATION. Soap Chem. Spec. 14(8): 103, 105, 107.
904. SEAY, V. 1946. COUNTY-WIDE WITH DDT. Farm and Ranch 65(7): 16.
905. SEDDON, H. R. 1948. A REVIEW OF COMMUNICABLE DISEASES OF ANIMALS IN AUSTRALIA WITH INDICATIONS OF THEIR ECONOMIC IMPORTANCE, DISTRIBUTION, AND INCIDENCE IN 1946-47. Serv. Publ. (Div. Vet. Hyg.) Dep. Health Aust. No. 3, 33 pp.
906. ——— 1951. DISEASES OF DOMESTIC ANIMALS IN AUSTRALIA. PART 2. FLY, LOUSE AND FLEA INFESTATIONS.

Serv. Publ. (Div. Vet. Hyg.) Dep. Health Aust. No. 6, 173 pp.

907. SEGUY, E. 1921. FAUNE ENTOMOLOGIQUE DES ILES CANARIES. SEJOUR DE M. P. LESNE DANS LA GRANDE CANARIE (1902-03). 2. DIPTERES PIQUEURS. Bull. Mus. Natl. Hist. Nat. Paris 4: 291-295.

Lyperosia minuta was reported as being present in the Canary Islands.

908. ——— 1923. FAUNE DE FRANCE, DIPTERES ANTHOMYIDES. Pp. 343-345. Paris.

Discussed *Haematobia* and *Lyperosia* and their associated parasites.

909. ——— 1935. ETUDES SUR LES STOMOXYDINES ET PARTICULIEREMENT DES MOUCHES CHARBONNEUSES DU GENRE "STOMOXYYS." Encycl. Entomol. B II. Dipt. 8, pp. 15-58.

Taxonomy of stomoxydinae was discussed; key was presented for the palearctic species of *Haematobia*.

910. SEN, S. K. 1939. THE POSSIBILITIES OF CATTLE FLY SPRAYS IN INDIA. Indian J. Vet. Sci. 9(4): 339-348.

Average milk yield was higher when cattle sprayed; increase of 1.6 lbs/day per cow.

911. SHAW, A. O. 1942. WHAT A COWMAN EXPECTS OF A COW-SPRAY. Soap Chem. Spec. 18(2): 90-93.

Sprays were tested on dairy cattle; daily milk production did not change in treated cattle.

912. SHIDELER, F. J. 1968. 1968 RANGE WAR; EXTENSION LAUNCHES AIR OFFENSIVE. Ext. Serv. Rev. 39(6): 6-7.

Aerial spraying was used to control horn and face fly populations.

913. SHTAKEL'BERG, A. A. 1933. GUIDE TO FLIES IN THE EUROPEAN PART OF THE U.S.S.R. GUIDES TO THE FAUNA OF THE U.S.S.R. (In Russian.) Inst. Zool. (U.S.S.R. Acad. Sci.) Publ. 7: 1-742.

914. ——— 1956. SYNANTHROPIC DIPTERA FAUNA OF THE

U.S.S.R. GUIDES TO FAUNA OF THE U.S.S.R. (In Russian.)
Inst. Zool. (U.S.S.R. Acad. Sci.), Publ. 60: 1-164.

915. SHULL, W. E. 1944. IDAHO RECOMMENDATIONS FOR INSECT CONTROL. Idaho Agric. Exp. Stn. Bull. No. 252.
916. SIMCO, J. S. 1962. A METHOD FOR FIELD DETECTION OF HORN FLY SUSCEPTIBILITY TO DDT RESIDUES. J. Kans. Entomol. Soc. 35(1): 167-170.
917. ——— and J. L. LANCASTER. 1960. CONTROL OF CATTLE GRUBS AND HORN FLIES BY SUMMER DIPPING WITH CO-RAL. J. Econ. Entomol. 54(1): 208-209.
Horn flies were controlled for 3 weeks using dips.
918. ——— and J. L. LANCASTER. 1964. LOW LEVEL FEEDING OF RONNEL FOR CONTROLLING HORN FLIES AND CATTLE GRUBS. Ark. Farm Res. 13(2): 16.
Horn fly control was good.
919. SIMMONDS, F. J. 1944. THE PROPOGATION OF INSECT PARASITES ON UNNATURAL HOSTS. Bull. Entomol. Res. 35: 219-225.
Discussed rearing of various insect parasites; horn fly was said to be a natural host of *Spalangia drosophilae*.
920. SIMMONDS, H. W. 1928. THE HOUSE FLY PROBLEM IN FIJI. Agric. J. Dep. Agric. Fiji. 1(1): 12-23.
921. ——— 1929. INTRODUCTION OF "SPALANGIA CAMERONI," PARASITE OF THE HOUSE FLY, INTO FIJI. Agric. J. Fiji. 2(1): 35.
S. cameroni was being reared from horn fly for house fly control.
922. ——— 1940a. INVESTIGATIONS WITH A VIEW TO THE BIOLOGICAL CONTROL OF HOUSEFLIES IN FIJI. Trop. Agric. 17(10): 197-199.
Hister chinensis was introduced from Java to the Solomon Islands for horn fly control.
923. ——— 1940b. SUMMARY OF A REPORT ON THE RECENT MISSION OF MR. H. W. SIMMONDS TO JAVA, MALAYA, MAU-

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HORSES IN PUERTO RICO. P.R. Agric. Exp. Stn. (Mayaguez) Bull. No. 37, 19 pp.

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1067. VERRALL, G. H. 1893. Entomol. Mon. Mag. 29: 291.
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1068. VESELKIN, G. A. 1964. THE CONTROL OF FLIES ON LIVESTOCK FARMS. (In Russian.) Veterinariya 41(6): 106-109. (Abstract in Rev. Appl. Entomol. 54:183, 1966.)
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1088. ——— 1892b. THE HORN FLY. South. Livestock J., July 28, 1892.
1089. ——— 1893. THE HORN FLY. Miss. Agric. Exp. Stn. Newspaper Bull., June 15, 1893.
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1093. WEHR, E. E., and J. T. LUCKER. 1952. INSECTS AND HELMINTHS IN INSECTS. U.S. Dep. Agric. Yearb. 1952: 169-179.
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1100. ——— 1903. HORN FLIES. TICKS IN CHICKEN HOUSES. Pacific Rural Press, Aug. 8, pp. 82-83.

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Lyperosia irritans reported to hibernate in the preimaginal stage.

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Slaked lime, gas lime, and borax added to cow manure killed horn fly larvae and prevented development of eggs in the dung.

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First record of horn fly in United States. Author received specimens from Comstock in 1887; date flies believed introduced to United States. Species named *H. cornicola* which is identical to present day *H. irritans*.
1106. WILSON, B. H., E. C. BURNS, W. T. OGLESBY, and others. 1963. THE EFFECT OF HORSE FLY CONTROL ON RATE OF INFECTION OF BOVINE ANAPLASMOSIS UNDER FIELD CONDITIONS IN LOUISIANA. J. Econ. Entomol. 56(5): 578-579.
Horn flies controlled by backrubbers treated with malathion.
1107. WILSON, F. 1960. A REVIEW OF THE BIOLOGICAL CONTROL OF INSECTS AND WEEDS IN AUSTRALIA AND AUSTRALIAN NEW GUINEA. Commonw. Inst. Biol. Control. Tech. Commun. No. 1, 102 pp.
Contains history of all introductions of natural enemies, liberation of native species, and parasite releases for control of *Siphona exigua*.
1108. ——— 1963. AUSTRALIA AS A SOURCE OF BENEFICIAL INSECTS FOR BIOLOGICAL CONTROL. Common. Inst. Biol. Control. Curepe, Trinidad. Tech. Commun. No. 3, p. 13.
Australia shipped predators and parasites to Hawaii for horn fly control; 1902-1903, 1919-1921.
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Records first appearance of horn fly in Canada near Quebec. Reviewed life history and horn fly control methods.

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1113. WINTERS, S. R. 1939. TRAPPING HORN FLIES. Hoard's Dairyman 84(19): 541.

1114. WITHERSPOON, B., and E. C. BURNS. 1967a. METHODS FOR SEXING ADULTS AND PUPAE OF THE HORN FLY. J. Econ. Entomol. 60(3): 884.

Pupae were sexed by candling under light source; females possessed proclinate frontoorbital bristles and the males did not.

1115. ——— and E. C. BURNS. 1967b. CONTROL IMPLICATIONS OF A BEHAVIORAL TRAIT IN MALE HORN FLIES. J. Econ. Entomol. 60(5): 1280-1282.

Flies that inhabit feet and lower legs of cattle were predominantly males. When feet and legs were sprayed twice weekly for 5½ weeks, the entire horn fly population was eliminated.

1116. WOLCOTT, G. N. 1922. INSECT PARASITE INTRODUCTION IN PUERTO RICO. J. Agric. Univ. P.R. (6)1: 5-20.

Horn fly found in all areas in Puerto Rico; two parasites were recovered from horn fly pupae; attempts were made to introduce dung beetles for horn fly control.

1117. ——— 1923. J. Agric. Univ. P.R. 7(1): 226.

Lists research publications and work done on horn fly in Puerto Rico.

1118. ——— 1948. INSECTS OF PUERTO RICO. J. Agric. Univ. P.R. 32(3): 228, 246, 493, 770, 782, 783, 808.

Reviewed parasite/predator introductions, life history, and bionomics of horn fly in Puerto Rico.

1119. WRICH, M. J. 1970. HORN FLY AND FACE FLY CONTROL ON BEEF CATTLE USING BACKRUBBERS AND DUST BAGS CONTAINING COUMAPHOS OR FENTHION. J. Econ. Entomol. 63(4): 1123-1127.

Both dust bags and backrubbers gave good horn fly control.

1120. WRIGHT, J. E. 1970. DIAPAUSE IN THE HORN FLY, "HAEMATOBIA IRRITANS." Ann. Entomol. Soc. Am. 63(5):1273-1275.

Interaction between the photoperiod to which adult flies were exposed and the temperature to which the developing immature stages were exposed was found to be necessary for pupal diapause.

1121. ——— 1971. OXYGEN CONSUMPTION BY DIAPAUSING AND NON-DIAPAUSING PUPAE OF THE HORN FLY. Ann. Entomol. Soc. Am. 64(6):1462-1463.

Diapausing flies used less oxygen than nondiapausing flies.

1122. ——— and D. D. OEHLER. 1971. FATTY ACIDS IN THE LARVAL DIET AND IN THE PHARATE ADULT OF THE HORN FLY, "HAEMATOBIA IRRITANS." J. Insect Physiol. 17:1479-1488.

A diet of cow manure and an artificial diet, both used to rear colony-strain and wild-strain larvae of the horn fly, were found to contain 16 and 11 fatty acids, respectively. Pharate pupae and pharate adults of colony reared on an artificial diet contained 16, whereas 17 were present in wild and colony flies when reared on fresh cow manure. Palmitic (C16:0), palmitoleic (C16:1), and linoleic acid (C18:1) were the principal fatty acids present in the two diets. The quantity of fatty acids changed little from larval-pupal apolysis through pharate adult development, but a decrease in total lipids occurred in the pharate adult immediately before emergence.

1123. YAKUNIN, B. M. 1966. BLOOD SUCKING FLIES (MUSCIDAE) "STOMOXYS CALCITRANS, L. YPEROSIA TITILLANS, L. IRRITANS, HAEMATOBIA ATRIPALPIS," FOUND IN SOUTHEASTERN KAZAKHSTAN. (In Russian.) Azo. Akad. Nauk. Kaz. SSR Ser. Biol. 2:73-75.

1124. YANOVICH, G. I. 1961. A STUDY OF THE BLOOD-SUCKING DIPTERA OF THE TIAGA REGIONS OF WESTERN SIBERIA AND EXPERIENCE IN THEIR CONTROL. (In Russian.) Med. Parazit. 30(3):323-324. Also Abstr. Rev. Appl. Entomol. 53:92, 1965.

1125. YOKOO, T., and J. HOTARI. 1941. STUDIES ON THE BLOOD-SUCKING INSECTS OF SHEEP IN KOREA. I. ON THE SPECIES, MORPHOLOGY AND BIONOMICS OF BLOOD-SUCKING FLIES. (In Japanese.) Oyo Dobuts. Zasshi. 13(1): 14-38. Also Abstr. Rev. Appl. Entomol. 30: 5, 1942.

Horn fly was widely distributed; attacked newly shorn sheep as well as cattle and horses.

1126. YOUNG, D. F., and A. G. BENNETT. 1968. GUIDE TO LIVESTOCK PARASITE CONTROL, BEEF CATTLE. Miss. Coop. Ext. Serv. Publ. 214.

1127. ZIMIN, L. S. 1951. THE FAMILY MUSCIDAE. TRUE FLIES (TRIBE MUSCINI, STOMOXYDINI). (In Russian.) Fauna of USSR. Dipterous Insects 18(4): 1-287.

1128. ZUMPT, F. 1939a. DAS SYSTEM DER STOMOXYDINAE. EIN BEITRAG ZU DEN SCHWEBENDEN FRAGEN DER TAXONOMIC. Verh. VII Int. Congr. Entomol., Berlin, 1938, 3: 1723-1733.

1129. ——— 1939b. WAS WISSEN WIR UBER DIE HYGIENSCHEN BEDENTUNG DER STOMOXYDINAE? Z. Hyg. Infektionskr. 121(6): 679-731.

Reviewed the literature on possible relation to the transmission of diseases to man and animals by *Stomoxys calcitrans* and *Lyperosia irritans*.

1130. ——— 1950. KEY TO THE STOMOXYDINAE OF THE ETHIOPIAN REGION, WITH DESCRIPTIONS OF A NEW "HAEMATOBIA" AND A NEW "RHINOMUSCA" SPECIES FROM ZULULAND. Inst. Med. Trop. 7:397-426.





